MAY 24, 1954

STEEL

THE WEEKLY MAGAZINE OF METALWORKING

MAY 24 1954

The Seaway . . .

NEW CHANNEL FOR BUSINESS

— Page 65

✓ GUARANTEED ANNUAL WAGE
The Case Against It, p. 58

✓ SAVE MONEY ON SPECIAL MACHINE TOOLS
Build-Your-Own Trend Grows, p. 96

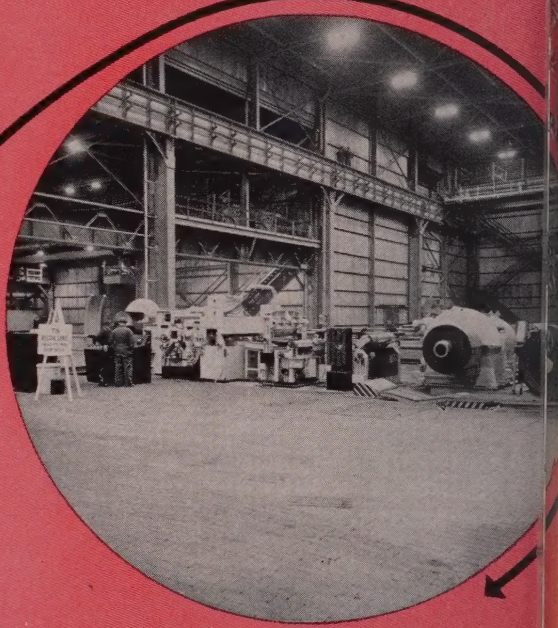
TIN SHEARING LINE . . . Receives coils (up to 36,000 pounds) from Temper Mill. Material is side trimmed, sheared to specified lengths and classified into primes and seconds . . . all automatically. This Aetna-built line in the Fairless Works of U. S. Steel has a rated speed of 1250 f.p.m. for regular tin plate gauges in sheet sizes up to 38" x 43".

Tin Shearing Line built by Aetna-Standard for Fairless Works, U. S. Steel.

Flat-Rolled Equipment

SHEARING AND CLASSIFYING · SCRUBBING AND DRYING · RECOILING · SLITTING AND SIDE TRIMMING · ROLLER LEVELERS · PAY-OFF AND TENSION REELS · SIDE TRIM AND RECOIL · SIDE TRIM AND SHEAR · TIN PLATE, SIDE TRIM AND SHEAR · CLASSIFYING

SIDE TRIMMING AND RECOILING LINE . . . This 40" line prepares coils for the Electrolytic Tinning Line of Fairless Works, U. S. Steel. The strip (in coil form) is side trimmed at speeds up to 4000 f.p.m. The line operates under tension with ends of coils joined by seam welding. Close tolerance and high speeds are essential to the successful operation of the line.



40" Side Trimming and Recoiling Line in Fairless Works of U. S. Steel.

THE AETNA-STANDARD ENGINEERING COMPANY · PITTSBURGH, PA.

Aetna-Standard

PLANTS IN WARREN, OHIO · ELLWOOD CITY, PENNSYLVANIA

GOOD EQUIPMENT BRINGS DOWN PRODUCTION COSTS

SUBSIDIARY and ASSOCIATED COMPAN

Head Wrightson Machine Company, Ltd., Middlesbrough, Englan — Great Britain, Finland, Sweden, Norway, Denmark, Union of Africa, Northern and Southern Rhodesia.
Aetna-Standard Engineering Company, Ltd., Toronto, Ontario, Ca
M. Castellvi, Inc., New York, N. Y. — Mexico, Central and America.
Societe de Constructions de Montbard, Paris, France — France, gium, Holland, Luxembourg, Switzerland.
Demag Aktiengesellschaft, Duisburg, Germany — Germany, Au Yugoslavia, Greece, Turkey, Egypt.
Compagnia Italiana Forme Acciaio, Milano, Italy — Italy.
Aetna-Japan Company, Ltd., Tokyo, Japan — Japan.
Hale & Kullgren, Inc., Akron, Ohio — Representative for the R Industry.
Standard Engineering Company, Ellwood City, Pa.
Trans-World Traders, Pittsburgh, Pa.

Designers and Builders to the Ferrous, Non-Ferrous, Leather, Rubber, and Plastic Industr

How Heat-Treatment Affects Alloy Steels

This is the fourth of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

There are in general five different forms of heat-treatment used with hot-rolled alloy steel. These treatments modify the mechanical properties of the steel to suit the end use. Basically, heat-treating may be defined as an operation or series of operations involving the heating and cooling of steel in the solid state to develop the required properties.

The five forms of treatment mentioned above, as applied to constructional alloy steels, are discussed in the following paragraphs:

(1) QUENCHING AND TEMPERING usually consists of three successive operations: (a) heating the steel above the critical range, so that it approaches a uniform solid solution; (b) hardening the steel by quenching it in oil or water; and (c) tempering the steel by reheating it to a point below the critical range in order to effect the proper combination of strength and ductility.

(2) NORMALIZING is a form of treatment in which the steel is heated to a predetermined temperature above the critical range, after which it is cooled slowly to below that range in still air. The purpose of normalizing is to promote uniformity of structure and to alter mechanical properties.

(3) ANNEALING consists of heating the steel to a point at or near the critical range, then cooling at a predetermined rate. Annealing is used to develop softness in steel, to improve machinability, to reduce stresses, to improve or restore ductility, and to modify other properties.

(4) SPHEROIDIZE-ANNEALING is the prolonged heating of steel at an appropriate temperature, followed by slow cooling to produce a globular condition of the carbide. This treatment produces a structure which may be desirable for machining, cold-forming or cold-drawing, or for the effect it will have on subsequent heat-treatment.

(5) STRESS-RELIEVING is the process of reducing internal stresses by heating the steel to a temperature below the critical range and holding for a time interval sufficient to equalize the temperature throughout the piece. The object of this treatment is to restore the elastic properties of the steel, or to reduce stresses that may have been induced by machining, cold-working, or welding.

Bethlehem metallurgists have had long experience in all methods of heat-treating. They understand the possibilities and limitations of each method with respect to various alloy steels. These men will be glad to give advice or help you with any problems concerning heat-treatment. Always feel free to ask for their services.

And call on Bethlehem, too, for the full range of AISI standard alloy steels, as well as special-analysis steels and all carbon grades. We can meet your needs promptly.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM ALLOY STEELS

BETHLEHEM STEEL

. . . Seen any lamplighters lately?

THE lamplighter's job seemed pretty secure . . . until someone discovered how to light a lamp without a flame; turn it out at the flick of a switch. Then the lamplighter disappeared — but a whole new industry was born.

For competition is at work everywhere, constantly directing the shape of things to come. Products that are better or less costly forge ahead — others are left behind.

Today, with competition rising to a normal, healthy pitch, manufacturers everywhere are seeking new ways to improve production and cut costs. That's where we at Heald can help you. In the vital matter of precision finishing, new Heald machines and advanced Heald engineering can often effect substantial savings—improve production speed and product quality too! Ask your Heald representative about the latest developments in automation, simultaneous and progressive borizing, improved grinding and loading methods.

Competition is wonderful if you're *ahead* of it. Our business is to help keep you there. That's why IT PAYS TO COME TO HEALD.

Internal and Rotary Surface Grinding Machines

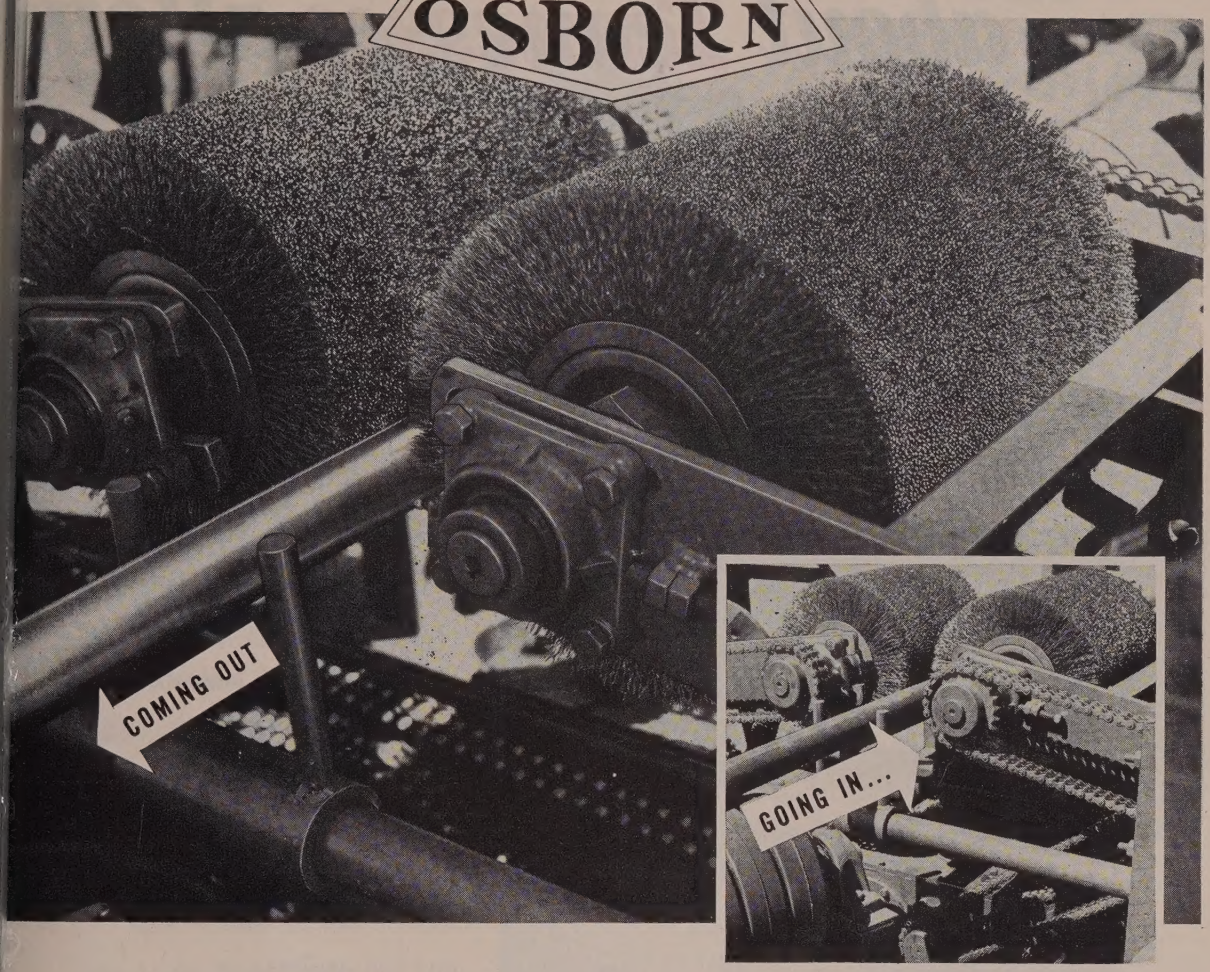
Bore-Matics

THE HEALD MACHINE COMPANY

WORCESTER 6, MASSACHUSETTS

Offices in Chicago • Cleveland • Dayton
Detroit • Indianapolis • New York

OSBORN



Turns out a manhour saving of 90%

This brushing machine cleans pipe with one-tenth the manhours required for hand tool brushing . . . and does a thorough job. The pipe passes between these Osborn Master® Wheel Brushes, whirling at 1800 RPM. Loose mill-scale and corrosion disappear, leaving a perfectly clean surface for painting.

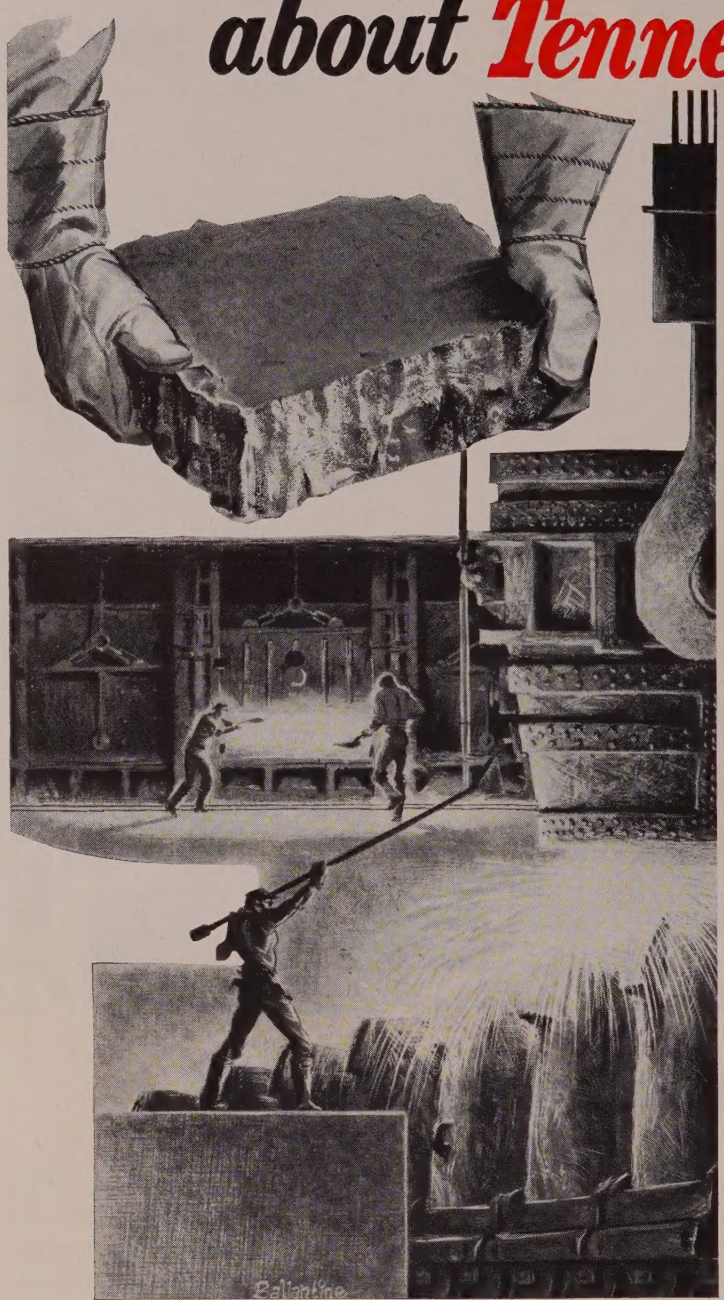
This "push button" brushing operation is typical of thousands devised with the help of the **O**sborn **B**rushing **A**nalyst. Very likely, he can help you . . . whether you process pipe or any of a multitude of other metallic or non-metallic products. Call your nearby OBA today to help cut your cleaning, finishing and deburring costs —or write *The Osborn Manufacturing Company, Dept. G-19, 5401 Hamilton Ave., Cleveland 14, O.*

FREE: New booklet on deburring with Osborn Power Brushing. Write for your copy.

Osborn Brushes

OSBORN BRUSHING METHODS • POWER, MAINTENANCE AND PAINT BRUSHES • BRUSHING MACHINES • FOUNDRY MOLDING MACHINES

about Tennessee alloys



Match your specifications

TENNESSEE'S line of ferro-alloy includes a wide variety of analyses grades, and sizes to meet your exact ing specifications. Ferrosilicon, ferro manganese and silicomanganese al loys are available in large, clea lumps, or in finely crushed an screened sizes for adding in the fur nace or the ladle. Shipped in bulk . . in 250 and 500 lb. drums . . . or i one-ton pallets.

TENNESSEE also produces lo phosphorous pig iron, high grade mal leable pig iron (made to individua specifications), Radiant foundry coke and Tenn-Sil sand additive. Writ Dept. S-5 for further information

TENNESSEE
PRODUCTS & CHEMICAL
Corporation
NASHVILLE, TENNESSEE.

Producers of: FUELS • METALLURGICAL PRODUCTS • TENSULATE BUILDING PRODUCTS • AROMATIC CHEMICALS • WOOD CHEMICALS • AGRICULTURAL CHEMICA

This Week in Metalworking

STEEL
THE WEEKLY MAGAZINE OF METALWORKING

Vol. 134 No. 21 May 24, 1954

✓NEWS ✓PRODUCTION-ENGINEERING ✓MARKETS

Metalworking Outlook 47

As the Editor Views the News 51

The Case Against the Guaranteed Annual Wage 58
Management's answer to the Steelworkers' proposal for supplementary unemployment compensation

Windows of Washington 62

St. Lawrence Seaway 65
Market Editor William M. Rooney sees start of boom for Great Lakes region as construction brings sea to midwest

Mirrors of Motordom 69

The Business Trend 73

Men of Industry 77

Technical Outlook 95

Design Your Own Special Machine Tools 96
Trend is definitely in that direction, and the suppliers are making it easy. Here are some examples

Alloying Agents Add Tailored Properties—Part II 98
Concluding portion of No. 2 in STEEL's heat treating series points up their relationship with carbon

How To Hot Work Titanium 100
Its ability to be worked with conventional steel mill equipment is the biggest application blessing

24 Places To Save With Alloy Steels 108
Short writeups of 24 different applications prove value of alloys despite higher first costs

Cast Alloys Tops For Hot Spots 122
There's a cast alloy or combination of several to handle any high temperature job. Here they are

New Products and Equipment 127

The Market Outlook 141
Metal Prices and Composites begin on Page 142

Nonferrous Metals 144

Behind the Scenes 6
Letters to the Editors 10
Calendar of Meetings 27
Obituaries 80
Helpful Literature 136

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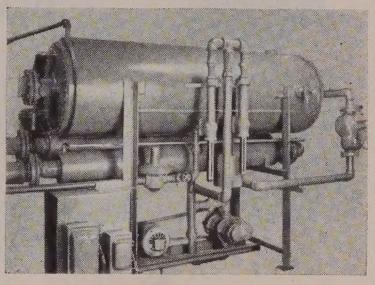
Both lean *and* rich gas ratios

S&W

HORIZONTAL TYPE EXOTHERMIC ATMOSPHERE GENERATORS



Answer *all* your standard requirements for bright or clean annealing and sintering. The Sargeant & Wilbur exothermic gas generator produces the controlled atmosphere you need — maintains constant gas mixture, lean or rich. Firing may be with manufactured, natural, propane or butane gas. Assured economy features are low maintenance cost, long satisfactory service life. S & W gas generators, both exothermic and endothermic types, are regularly supplied as standard units in capacities from 125 to 5000 C.F.H. Larger sizes will be made up readily to your order — and good service on all orders is our regular routine. To compare S & W performance, send your samples for processing — without obligation.

Have Samples Processed Free

Find out how satisfactorily the S & W Exothermic Generator will do your own work — bright or clean annealing of low carbon steel, copper and copper alloys; sintering of low carbon iron or non-ferrous mixtures in powder metallurgy. Just send us samples and specifications. Prompt follow-through — no obligation.

S&W

Write today for details on S & W gas generators. Just state your regular requirements—we'll supply the facts.

SARGEANT & WILBUR, INC.
182 Weeden Street, Pawtucket, R. I.

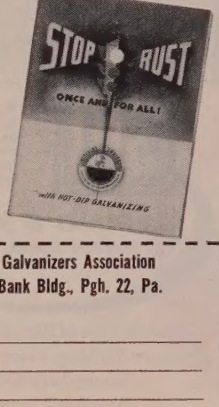
Complete Line of Electric and Fuel-Fired Furnaces To Meet Every Industrial Need
Atmosphere Generators
Ammonia Dissociators
Gas Conditioning Equipment

STOP RUST

once and for all

with HOT-DIP GALVANIZING

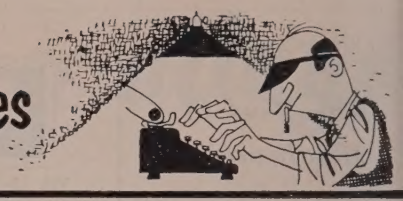
Send your iron and steel products to a member of the American Hot-Dip Galvanizers Association. His years of experience plus collective know-how assure you of a top quality job—if it's iron or steel have it Hot-Dip Galvanized.



Send for Free Booklet

American Hot Dip Galvanizers Association
1607 1st National Bank Bldg., Pgh. 22, Pa.
Print
Name_____
Firm_____
Address_____
City_____ State_____

behind the scenes



Have You Ever Been?

Ambrose, the ambidextrous office boy, dropped a letter on our desk the other day which was postmarked Peculiar, Missouri. We pinched Ambrose's nose between our lily-whites and attempted to force a confession from him.

It was no gag. There actually is a town named Peculiar and, sure enough, it's in Missouri.

We heel-and-toed down to our bustling census department and attacked the library of reference directories. Here are some of the bean-busters we came up with: Rich, Mississippi; Sweet Home, Oregon; Smackover, Arkansas; Bee, Virginia; Little, Kentucky; Clover, Virginia; Maiden, North Carolina and Batchelor, Louisiana.

But of all the intriguing names we happened upon, one sticks out as the place we'd most like to be from. It's a little hamlet nestled snuggly in the shoulder of a pine-tree clad mountain in the great Northwest. It's a lovely spot—serene—idyllic—a veritable paradise on earth. No metalworking here. Not even a copy of STEEL to divert you from the Eden-like bliss of this oasis of the mountainside.

You simply must visit Pysht, Washington. And soon.

Put a Little Color in It

Being on the color blind side ourselves, we were intrigued to discover the tremendous impact color has on the sale of products today.

Did you know, for example, that car manufacturers claim that intellectual people like blue cars, athletes like red ones, egotists buy yellow ones and extroverts prefer orange.

In the Southwest, we understand, vivid colors are most popular, on the Pacific coast they like light pastel shades, while in New England, you've guessed it, they prefer conservative blues and grays.

Surprisingly little thought is given to color on merchandise. But, a seed company recently changed its catalogue from black and white to color and average sales went from less than one dollar to over nine dollars per customer.

A cafeteria doubled the sale of its salads by using green plates instead of white.

And a farmer discovered that white eggs sell better in blue containers while brown ones have more buy appeal in white ones.

When you consider that a spectrophotometer (we so hope we're right) can distinguish 2 million different colors, and that the human eye can make sense out of 17,000 of these your color horizons are unlimited. Better get out the beret and palette. There's a color exclusively yours somewhere which might add just the sales appeal you need.

After all, look what lipstick did for women.

Markets Unlimited

We were reading the other day where a breakfast food manufacturer discovered a profitable market for his product in South America—as a dessert!

Old horseshoes, we are told, provide ideal material in China—for the manufacture of razor blades.

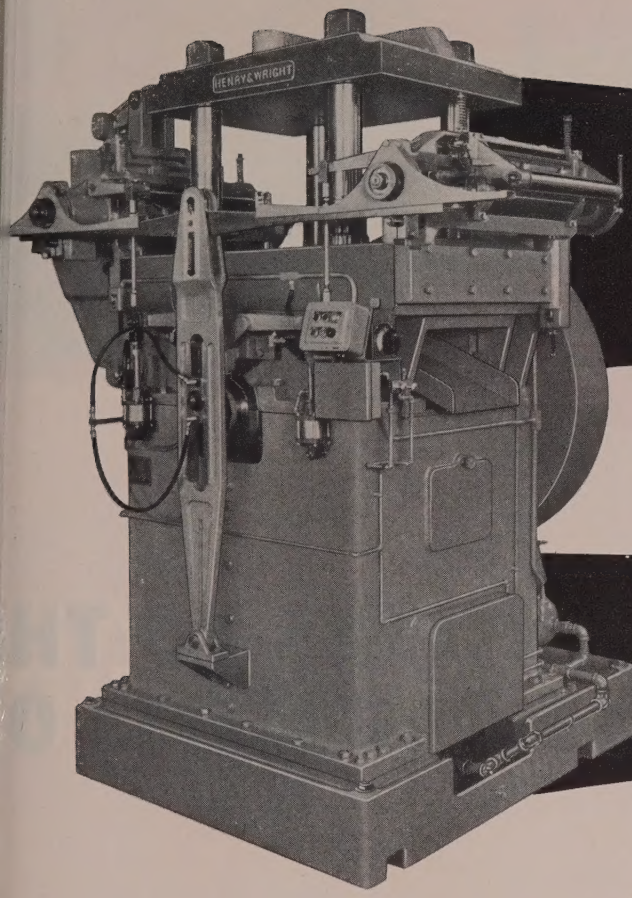
A lot of hot water bottles were sold in Spain—because local women held them to their cheeks to produce a maidenly BLUSH!

Despite the fact that American women like their needles in packets of assorted sizes, one exporter took an awful lacing in China before he discovered that Chinese women consider assorted needles to be "an ill assortment of unmatched needles."

All of which merely proves that there is a market for almost anything somewhere in the world—that oftentimes it pays to investigate new ways to exploit the features of an old product.

Shrdlu

(Metalworking Outlook—Page 47)

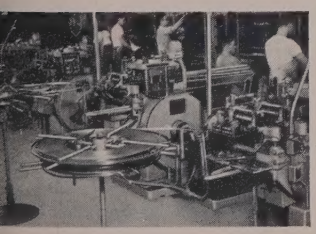


OVERTIME PRODUCTION in a 40-hour WEEK

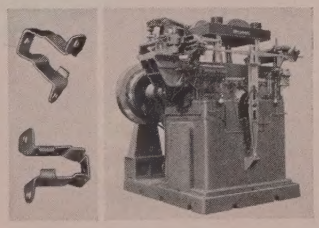
If you have to produce more in a given time — the proven answer is a Henry & Wright Dieing Machine. Here is the capacity that enables you to keep pace with sudden scheduling changes; the consistent accuracy that permits you to set and automatically meet higher standards of work quality, while reducing cost.

In the Henry & Wright Dieing Machine, you have a production tool designed for high speed, built to widen radically the practical application of progressive stamping and engineered to prolong the life of your dies. Outstanding in its application for light and medium gauge metals, the Dieing Machine is also demonstrating that it can achieve equally extraordinary results in stamping and forming heavy gauge parts.

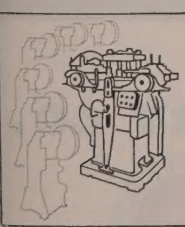
You owe it to yourself to include the Henry & Wright Dieing Machine in your plans for modernization, expansion or replacement. We welcome an opportunity to discuss its specific application to your requirements.



25-ton Henry & Wright Dieing Machines with twin die set-ups produced 435 parts per minute per machine at Barber-Colman.



200-ton Henry & Wright Dieing Machine producing 54 completed hinge boxes per minute from 5/32" x 13" steel in coil form.



ONE SET UP INSTEAD OF MANY WITH H&W DIEING MACHINES

HELPFUL DATA *is available in our fact-packed catalog which you can have by writing Henry & Wright, 441 Windsor St., Hartford, Connecticut.*

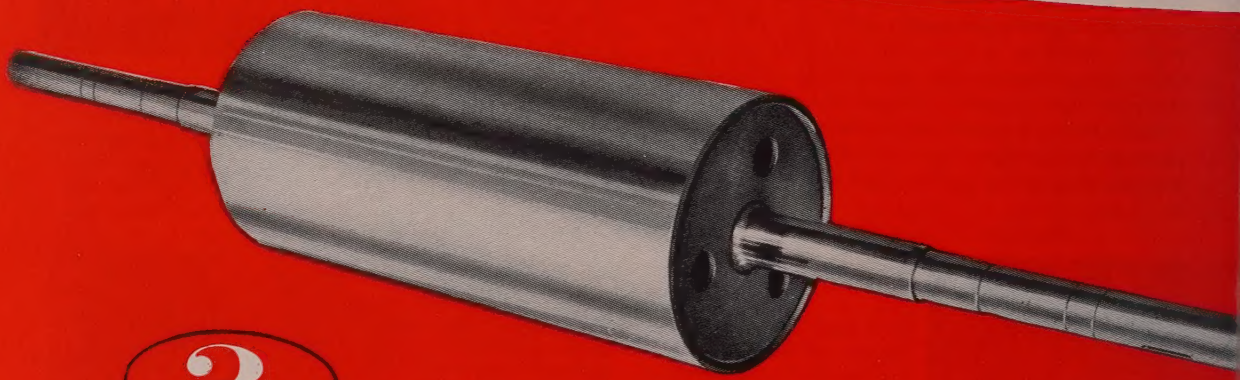
HENRY & WRIGHT

DIVISION OF EMHART MFG. CO.

HARTFORD, CONNECTICUT

1

TWO SOLUTIONS TO TH
CHALLENGING PROBLEMS O



2

UNITED STATES PIPE & FOUNDRY CO.

Special Products Division

BURLINGTON, NEW JERSEY

SALES OFFICES: LOS ANGELES, CHICAGO, ST. LOUIS, CLEVELAND, DETROIT, PITTSBURGH, CAMBRIDGE (MASS.), BURLINGTON

OUNDNESS

T 2150° F.

1 Because of their inherent soundness, metal mold centrifugally cast retorts give longer operating life at extreme temperatures. These retorts have been tested in service under the most adverse operating conditions, and field performance data prove their superiority conclusively.

Centrifugally cast stainless steel retorts are used by the New England Lime Company of Canaan, Connecticut to produce high purity magnesium metal by thermal reduction. Their retorts are operated 24 hours a day at 2150° F. under a high internal vacuum — a test only the ultimate in soundness and quality could survive.

HIGH TEMPERATURE

SURFACE

AT 1400° F.

2 The Selas Corporation of America, one of the nation's leading industrial furnace builders, demands a high order of quality in the stainless steel rolls used in their continuous strip annealing furnaces. Perfect roll surfaces are a "must". The slightest surface imperfection in the strip will cause rejection.

Long, trouble-free life, at extreme temperatures, is assured because of the dense, flawless roll surface made possible by the metal mold centrifugal process.

In cylindrically shaped sections, U. S. Pipe offers a wide range of sizes in electric furnace alloys for many difficult and exacting applications.

"METAL MOLD" CENTRIFUGAL CASTINGS

SIZE RANGE AND COMPOSITION FLEXIBILITY

Outside Diameter	4" to 30"
Wall Thickness	⅜" and up
Length	Up to 14' in the "as-cast" condition
Type of Stainless Cast	All Standard AISI and ACI grades of ferritic and austenitic stainless plus "Special" types

Production Capacity DOUBLED...

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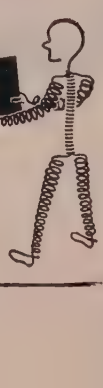
"SPECIAL PROCESSED"
COLD HEADING WIRE
for

- Phillips Head Screw
- Clutch Head Screws
- Cross Recessed Head Screws

The unique upsetting qualities of Special Processed wire are recognized by licensed recess head screw manufacturers across the nation. The excellent flow properties of this superior cold heading wire together with its structural soundness give this wire unsurpassed performance on difficult cold heading jobs.

To meet the ever-increasing demand of new customers while continuing to serve its present customers, Keystone is doubling its production capacity on Special Processed wire. We'll be glad to show you how Special Processed wire can improve the quality of your product and lower your production costs. Write us for additional information.



INDUSTRIAL WIRE SPECIALISTS

Keystone Steel & Wire Company
PEORIA 7, ILLINOIS

LETTERS
TO THE EDITORS

Reclamation Saves $$$$

We have been told that in a recent issue of STEEL you carried a story describing the waste and oil reclamation program of a metalworking plant. According to our informant, the story stated that the plant was able to realize gross savings of $235,000 in 20 months of operation on an investment of $79,000 in chip handling and oil reclamation equipment.

If you can identify this story, we would appreciate a tear sheet of it.

D. A. Colvin
American Machine & Metals Inc.
East Moline, Ill.

• *The story, "Waste Handling Is Turned to Profits" (Apr. 26, p. 116), concerned the Eaton Mfg. Co., Cleveland. Tear sheets have been sent.—ED.*

Metal Selector Fills a Need

I was particularly pleased to see the Metal Selector in your May 10 issue. I would appreciate very much six additional copies.

R. C. Wissner
Williams & Co. Inc.
Cleveland

Please send six copies . . . we find this most valuable.

Paul I. Davis
district manager
Sharon Steel Corp.
Sharon, Pa.

I would like five copies . . .

William H. Yake
American Kitchens Division
Avco Mfg. Corp.
Connersville, Ind.

We would appreciate five copies . . .

Alvin G. Karp
Mesta Machine Co.
Pittsburgh

Please send us three copies . . .

J. J. Beinlich, manager
Technical Information Section
Research & Technology Division
United States Steel Corp.
Pittsburgh

May we have three copies . . . every copy of STEEL in the plant is likely to have this chart removed.

F. M. Weitlauf
Timken Roller Bearing Co.
Canton, O.

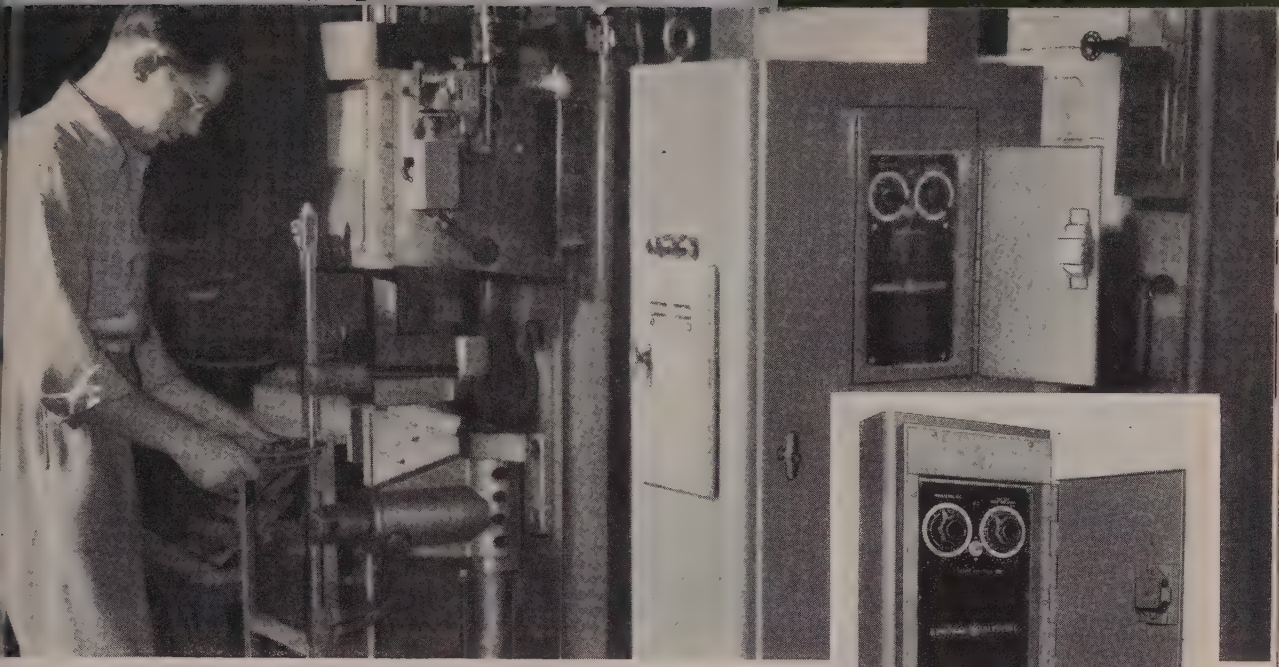
Please send 12 copies . . .

S. Haag
Surface Combustion Corp
Columbus, O

Porcelainizing Aluminum

We note with interest the Technica Outlook item "Porcelainized Aluminum' (May 3, p. 95). Quite the contrary to the statement in this item, aluminum is now being coated with porcelain

(Please turn to page 12)



DETRIMENTAL FLASH, SPATTER, OR EXPULSION in welding aluminum or stainless assemblies when you use G-E Slope Control. Shown here applied to a G-E synious precision resistance welding control, this accessory overcomes the disadvantages ddenly applied welding currents . . . gives longer electrode life and reduces tip pickup. e time dial is at left, heat control setting at right.

Now, Standard Welding Machines Meet Special Production Requirements

with G-E Accessories for Resistance Welding Controls

ly added to present equipment or included in your G-E resistance welding control, these specialpose G-E accessories now make possible special protion performance with standard machines. They can pplied to synchronous or nonsynchronous controls.

ctically any application requirement can be met with controls . . . correcting for current voltage variaes, controlling rate at which current rises to welding ue, tempering or forging, etc.

complete information on G-E control and control essories for resistance welding contact your nearest Apparatus Sales Office or your welding machine nufacturer, or send in coupon at right.

General Electric Company, Section B790-2
Schenectady 5, New York

- ☐ GEA 6075, Accessories for Resistance Welding Controls
- ☐ GEA 5945, Synchronous-precision Control
- ☐ GEA 5816, The Story of Resistance Welding—theory behind the process and complete description of all G-E controls

Name .....

Company .....

Address .....

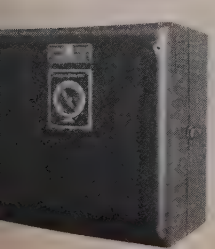
City ..... State .....

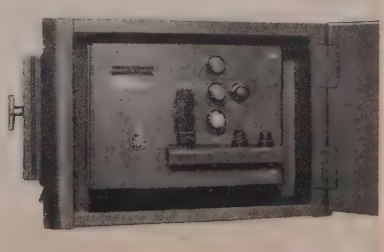
GENERAL ELECTRIC

ROVE WELD QUALITY -correct ining voltage variations with G-E age-compensating Regulator . . ntains rms weld current within ±2%.

REDUCE REJECTS—for better, more consistent welds this self-enclosed and completely automatic G-E Current Regulator maintains constant welding current within ±2% of preset value.

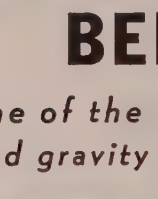
REDUCE WELD CRACKING and porosity, eliminate excessive indentation. G-E Up-down Slope Control provides gradual current increase and decrease.





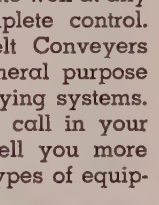
BELT CONVEYERS

one of the many types of high-quality power and gravity conveyers in the MATHEWS Line



The Belt Conveyer is one of the most efficient and commonly applied types of material handling equipment. It can be installed level, inclined, declined, or in a combination of these designs, and will operate well at any reasonable speed under complete control. The full line of Mathews Belt Conveyers ranges from standardized, general purpose units to highly complex, continuous flow conveying systems. When you have package handling problems, call in your nearest Mathews representative. Have him tell you more about Mathews Belt Conveyers and the other types of equipment in the complete Mathews line.

● Write for Bulletin G.P. 53, giving details on the Mathews General Purpose Belt and Live Roller Conveyers . . . or for Catalog No. 853, featuring numerous installations that could possibly offer a solution to your conveying problem. Both are yours for the asking.



MATHEWS CONVEYERS

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CANADIAN DIVISION . . . *Mathews Conveyer Company, Ltd.*
PORT HOPE, ONTARIO

Engineering Offices or Sales Agencies in Principal American and Canadian Cities

LETTERS

(Concluded from page 10)

enamel on a production basis by conventional methods similar to those used in applying porcelain enamel to steel.

The application of porcelain enamel on aluminum is fundamentally the same as the application of porcelain enamel on steel in that both must be cleaned, treated, sprayed and fired. An extra step is necessary in the aluminum processing: The metal must be *pre-fired* in a furnace (at temperatures of 970 to 1000° F) before spraying and firing. Different chemicals are used in cleaning and treating aluminum from those used in steel, but the main difference in the enameling processing is in the temperatures. Aluminum ground and cover coats are fired at temperatures of 970 to 1000° F; steel ground and cover coats are fired at 1500 to 1600° F.

Thus far this institute has prepared no technical bulletins or other literature on the application of porcelain enamel on aluminum. A number of our member companies have prepared literature on this subject, however.

William N. Brinker
administrative assistant
Porcelain Enamel Institute
Washington

Concerning Heat Treating

Referring to your article "A Look at Custom Heat Treating," I want to compliment you on an excellent job. Naturally, it does my heart good finally to see in print an intelligent and factual recognition of the part that commercial heat treating is playing in modern metalworking.

C. E. Herington
Metal Treating
Metal Treating Institute
New Rochelle, N. Y.

When the Word Gets Around

This is to tell you how much we appreciated the very splendid illustrated article "Fastening Costs Take a Nose Dive" (Apr. 12, p. 100). We already have received nearly 30 letters of inquiry from American manufacturers.

Will you please send us six copies of this issue?

E. L. Crockatt, president
Crockatt Engineering Co.
San Francisco

● *Sent.—ED.*

Wide Range of Interest

We have been reading with great interest your series of articles on the pros and cons of leasing (Mar. 29, Apr. 5 and Apr. 12). We would like to have 100 reprints of the series as we found the articles very instructive and informative and extremely well written.

Walter E. Kohrs
LeTourneau-Westinghouse Co.
Peoria, Ill.

We would appreciate receiving three or four sets of tear sheets of your story "Apprentices: Assurance of Skilled Labor Tomorrow" (May 3, p. 65).

Marvin S. Reese
Fred Wittner Advertising
New York

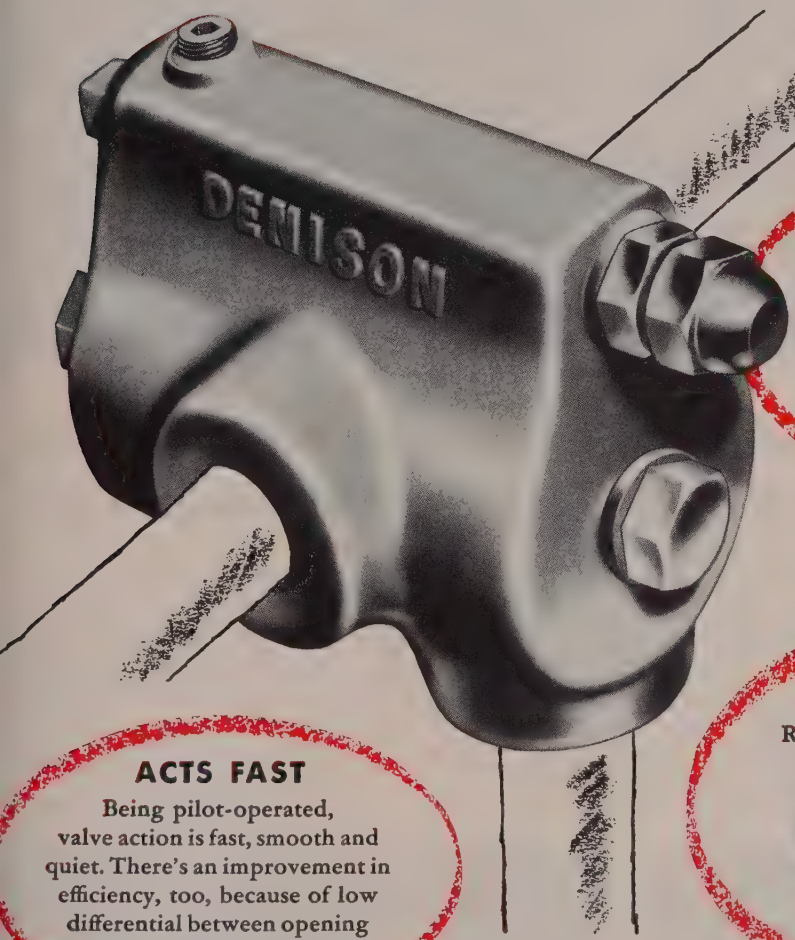
We would appreciate six tear sheets of your article "New Tool for Roll Forming" (Mar. 29, p. 120).

C. M. Binney
district sales manager
Allegheny Ludlum Steel Corp.
Pittsburgh

Announcing a new line of

DENISON RELIEF VALVES

• LOW PRICE • 2000 PSI • PILOT OPERATED



LOW PRICE

A new line of pilot-operated relief valves with the widest range of pressure regulation of any in use on 2000 psi circuits today. *Yet they sell at an unusually low price.*

4 SIZES

½", ¾", 1¼" and 1½". Rated capacities of 10, 20, 60 and 80 gallons per minute.

ACTS FAST

Being pilot-operated, valve action is fast, smooth and quiet. There's an improvement in efficiency, too, because of low differential between opening and closing pressures.

DENISON *HydrOILics*

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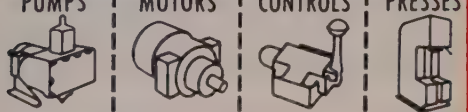

THE DENISON ENGINEERING COMPANY
COLUMBUS 16, OHIO

WRITE TODAY

for free Bulletin No. 152. It gives operating characteristics, capacities, sizes and dimensions of the new line of Denison Series M Relief Valves.

The Denison Engineering Company
1163 Dublin Road • Columbus 16, Ohio

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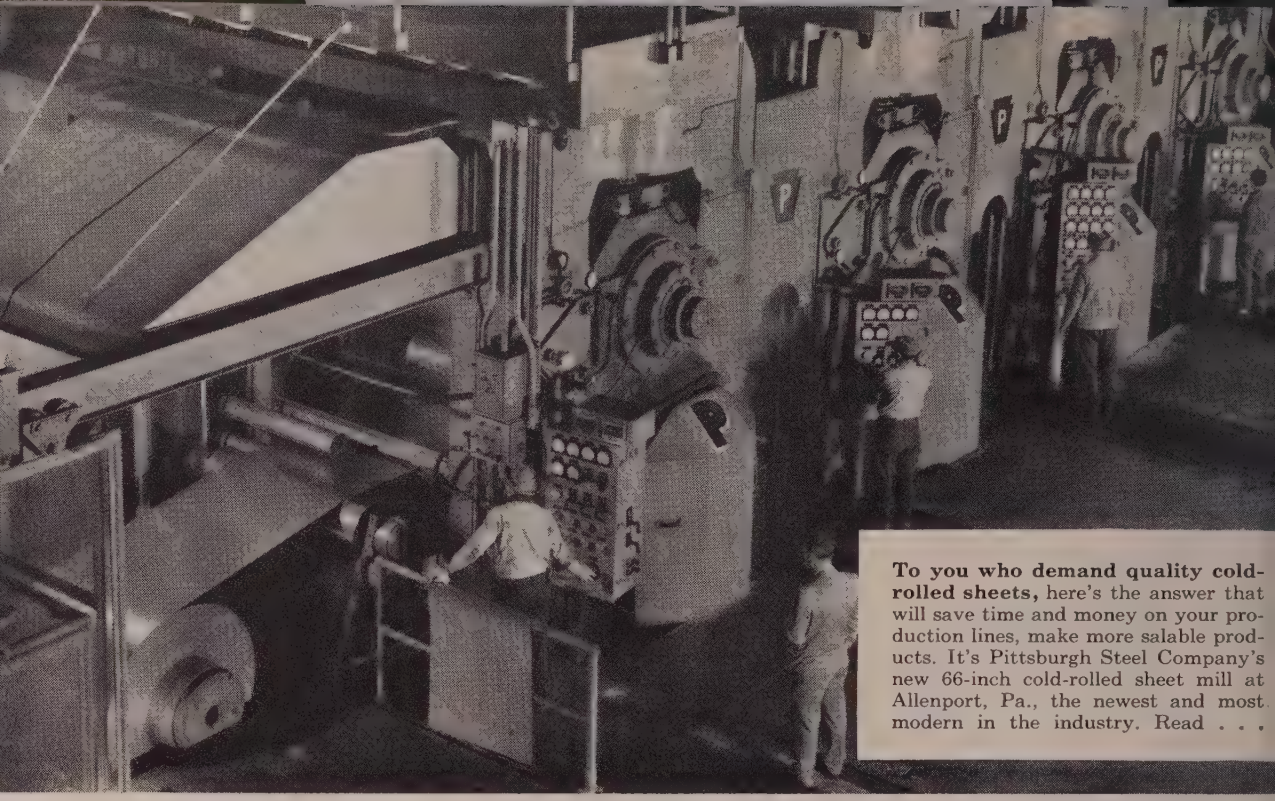


To you who demand quality cold-rolled sheets, here's the answer that will save time and money on your production lines, make more salable products. It's Pittsburgh Steel Company's new 66-inch cold-rolled sheet mill at Allenport, Pa., the newest and most modern in the industry. Read . . .

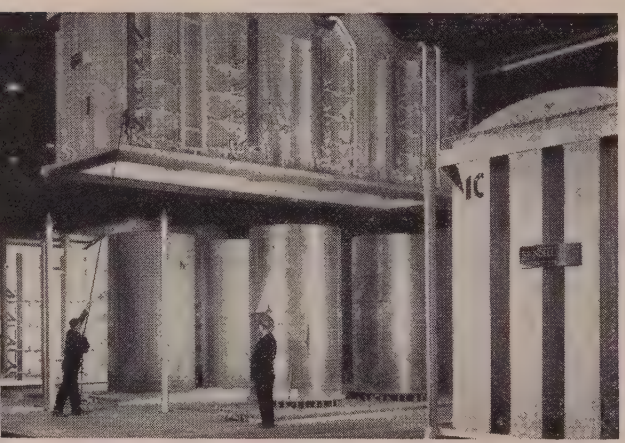
Six Good Reasons Why You Get More For Your Money When You Buy Cold-Rolled Sheets From Pittsburgh Steel

1. You get good steel to start with. Cold-rolled sheets are no better than the basic steel from which they are rolled. Pittsburgh Steel, in competition with other steel makers, has produced and sold millions of tons of steel ingots and slabs carefully made from their own selected raw materials for others to finish into flat-rolled steel, *without one complaint.* So they know how to make the kind of steel that fabricates more easily as hot and cold-rolled sheets.

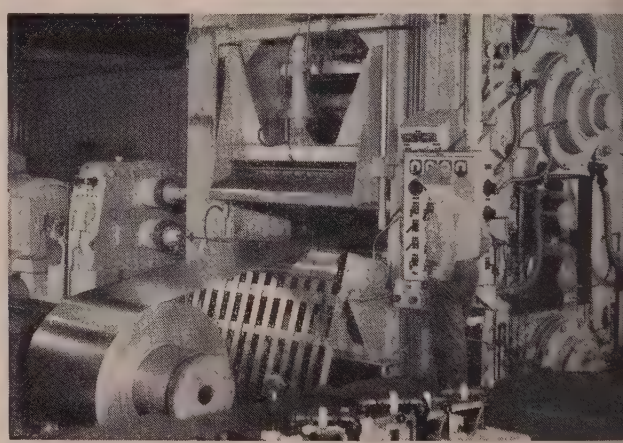
2. This new rolling mill is equipped with four stands weighing nearly 200 tons each to assure solid, rigid pressure on the rolls—reduce variation of gage. The electrical system for controlling mill speeds is technologically the most advanced in the industry. X-ray gage and other electronic devices control uniformity of sheet thickness and shape.

3. Pittsburgh Steel sheets have a better finish because surface quality must start with good steel, properly hot rolled. Pittsburgh Steel's new hot-rolled sheet mill with its four-high reversing roughing mill and its four stands of four-high finishing mills imparts the proper internal grain structure and smooth surface, two important requirements for obtaining good finish and internal quality when steel is later cold rolled.

4. You get less breakage, higher yields

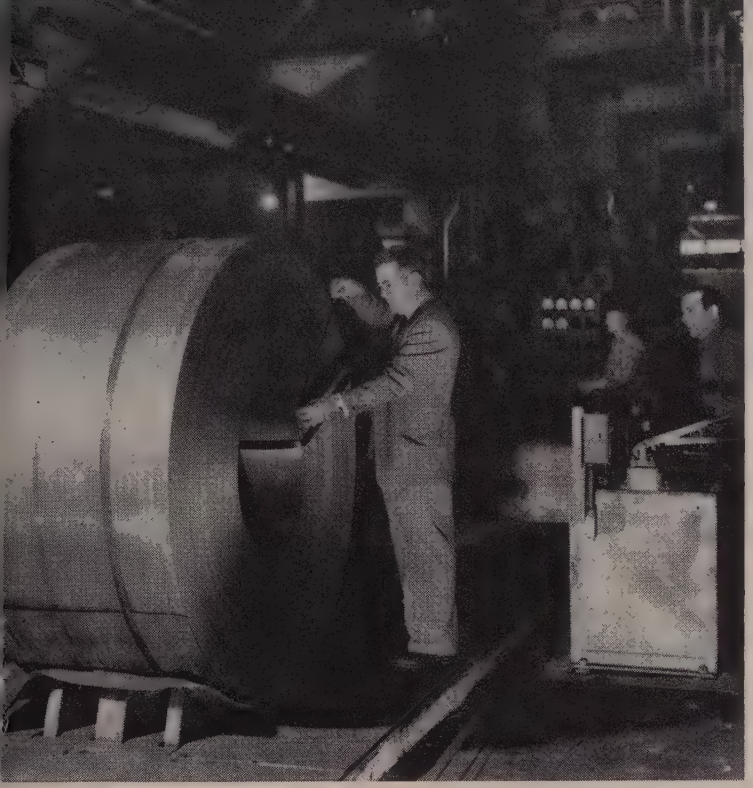


Coils Stacked on Heavy Circular Bases and encased in a round inner cover of steel plate are housed in one of the 12 portable annealing furnaces. Heating slowly and evenly and then allowing to cool restores ductility.

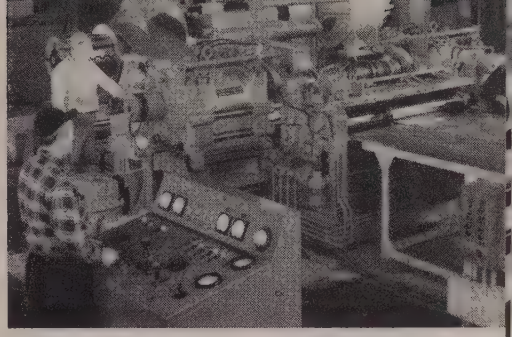


Temper Rolling—This 2,800 horsepower, one-stand mill makes only a slight reduction in the now ductile steel, gives a smoother surface, produces a flat and uniform sheet.

(Advertisement)



-Rolled Coils weighing up to 60,000 pounds emerge from the mill. It took ears to plan, two more to build this new mill. It was designed with one thought nd—to give you more of the desirable qualities in cold-rolled sheets.



For Those Who Order Narrower Widths, coils can be slit on this new cold mill slitter line, or on the new slitter line for the hot mill. On this unit, wide coils can be slit down to widths as narrow as 2 inches.

A Flying Shear cuts coils of steel into individual sheets varying in length from 2 to 30 feet on one of the three new shear lines in the hot and cold rolling mills. Each sheet is individually inspected after it emerges from the reciprocating shear opposite the controls.

Pittsburgh drawing quality steel ts because they are more easily ed, stretched and shaped. The rea- for better ductility are good physical ture of the steel, proper condition- cleaning, annealing, and expert roll- o exact tolerances on 1954-model pment. Take a complicated shape n automobile door panel for exam- Feed finished steel sheet into the die high-speed press and it must have ent quality to form a perfectly ed panel that will fit and hinge prop- nd look attractive on the showroom

Because of smooth finish, close tol- es and shape you have less grinding, ning and finishing to do on your l or section before fabricating and ing or enameling.

Because Pittsburgh sheets are l to order to fit your expensive dies ctly, dies last longer, there's less time required to cut and refinish worn by sheets that vary in gage. *tal* these six reasons and you can see you actually get more for your y with Pittsburgh cold-rolled sheets. tsburgh Steel does not claim to be nly producer of fine quality steel s in the country. The point Pitts- n Steel makes is this:

you must have the best quality cold- l steel sheets in the manufacture of quality products, and you are faced the job of making better products wer cost, why not make Pittsburgh back up what it claims for its new mill. This new steel company with an old name welcomes the opportunity to demonstrate what it can do for you.

There's another important reason why you should consider Pittsburgh Steel as one of your sheet suppliers and that's better service. This mill now in production was built to serve you. You now have another source of supply. It's the equivalent of an insurance policy against a return of premium prices in the event of shortages in the future. From the president right on down to the workmen in the mills, you'll find at Pittsburgh Steel a willingness and desire to help service an order.

If you use cold-rolled or hot-rolled sheets, strip specialties, or seamless tubular goods or wire products in the manufacture of the quality products you sell, there's a Pittsburgh Steel salesman near you. Chances are you know him. If not, he would like to get acquainted with you, your steel requirements and your production problems. A phone call, telegram, or letter to the office nearest you will bring him in a hurry!

Packaged to Protect It During Transport, sheet from the hot and cold rolling mills goes out to customers across the country by rail, truck, or down the inland waterways by barge.

"Everything New But The Name"

Pittsburgh Steel Company

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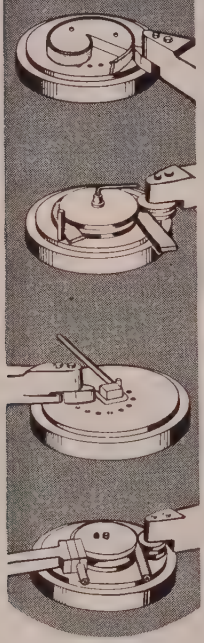

This instructive and authoritative booklet will quickly prove itself indispensable wherever bending is done or is needed. It brings you a veritable gold mine of tested authentic bending methods applicable to any rotary type bender. The proper bending technique may frequently offer a new approach to an old problem by simplifying product design and cutting production costs.

The exact methods of producing various types of bends in a wide range of materials are illustrated, step by step, with over 90 diagrams and charts together with valuable tooling suggestions.

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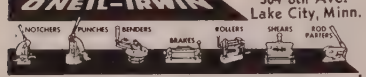

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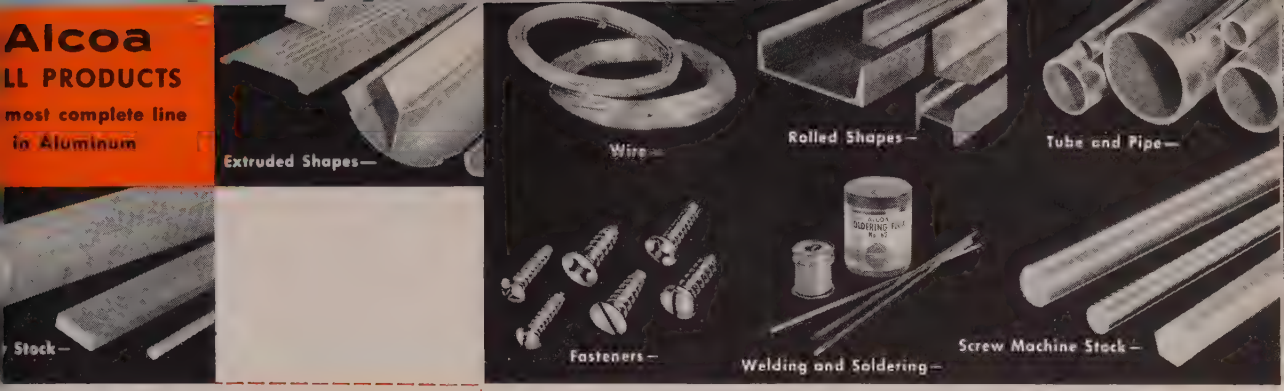
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Assembly and machining fixtures, jigs, forming dies, pattern plates and low-pressure molding dies for rubber and plastic cost only half as much when you make them from Alcoa® Aluminum Tool and Jig Plate instead of steel.

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Many manufacturers are turning to Alcoa Aluminum Tool and Jig Plate for the major economies it affords. It's another of Alcoa's Mill Products, the most complete line in aluminum, designed to help you get faster production at lower cost. Your local Alcoa sales office will provide detailed counsel from the world's greatest fund of aluminum knowledge.

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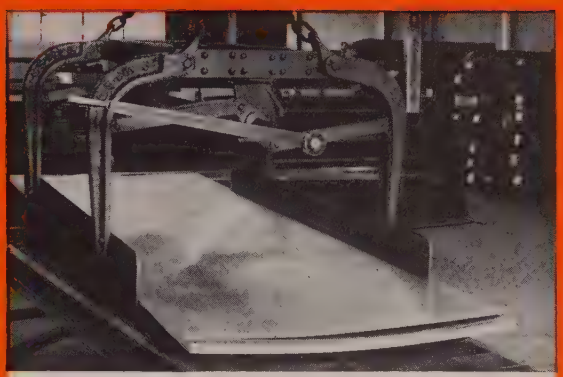
EXTRUDED SHAPES: For thresholds; window sills; door frames; glass stops; copings; gravel stops; trim; truck bodies. Also angles; channels; tees; zees; etc., for structures.

TUBE AND PIPE: Coiled tube; Alcoa® Utilitube; straight tube in round, square and rectangular shapes; heat exchanger tubes; standard pipe and pipe fittings; construction pipe; rigid conduit.

WIRE AND ROD: Coiled and straight length; flattened wire; rivet wire and rod for die heading operations in manufacture of rivets, nails, bolts and screws.

OLLED SHAPES: Equal angles; unequal angles; chan-els; I-beams; tees; zees. Suited to a variety of structural pplications.



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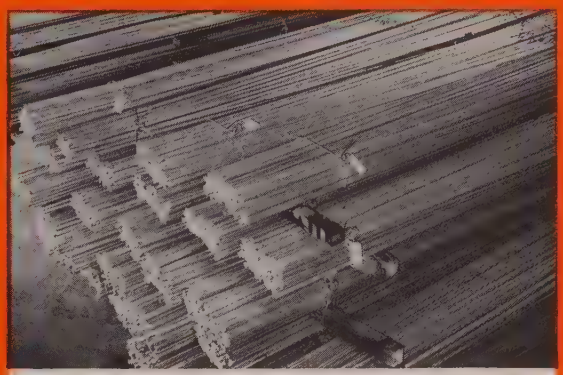
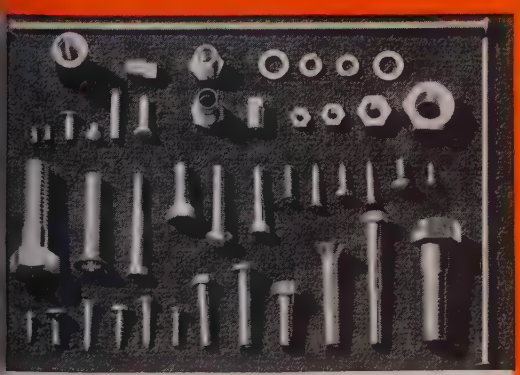


SCREW MACHINE STOCK: Available in 11S-T3, the free-machining alloy and 17S-T4, a higher strength alloy plus 24S, 61S and 75S.



ASTENERS: Machine screws, wood screws; washers; uts; bolts; rivets. Recommended for fastening aluminum o prevent electrolytic damage.

WELDING AND SOLDERING: Welding and brazing wire; welding and brazing flux; solder flux; solder.

Your Alcoa Distributor has Alcoa Standard Warehouse items in stock

Your Alcoa Distributor is as near as your telephone and his warehouse is stocked with the aluminum products you need for fast, economical production. His facilities include modern equipment for sawing, shearing and slitting stock to your specifications and for making prompt deliveries.

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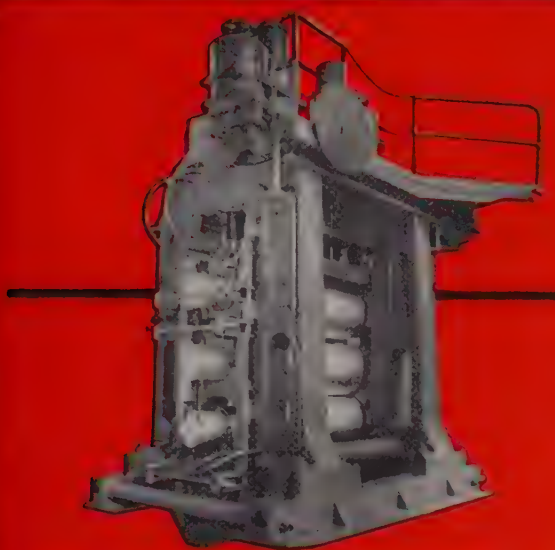

26" Three-high Blooming Mill Stand, part of a complete Blooming, Slabbing, Structural, Wire Rod and Strip Mill.

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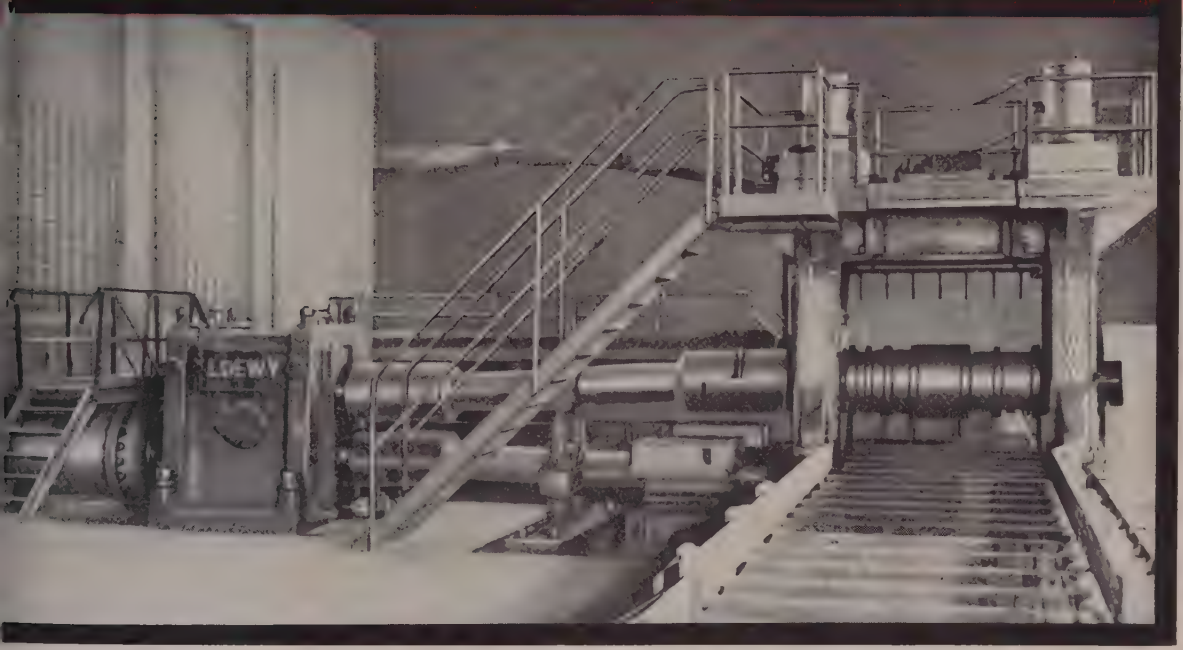

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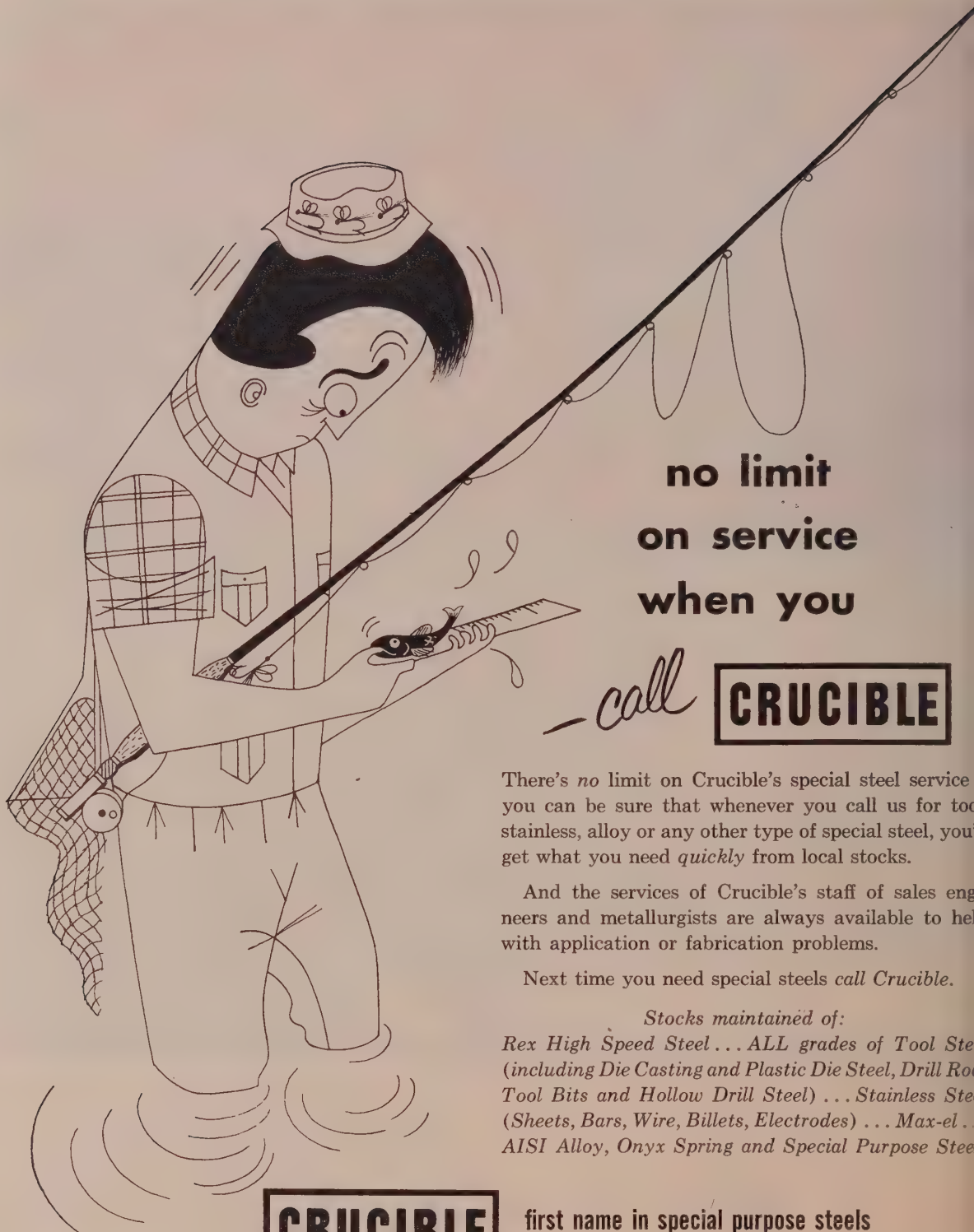

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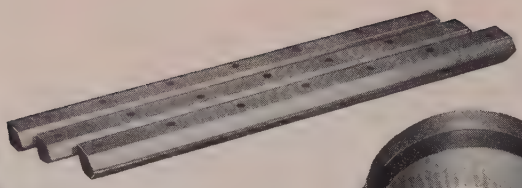
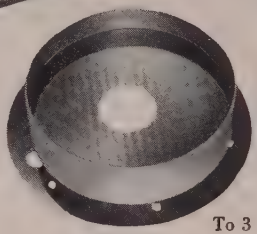


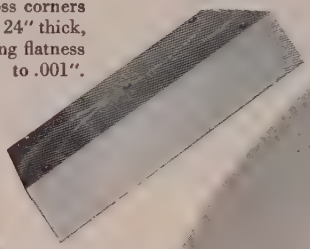
Hardened steel machine tool ways, 2½" x 3½" x 50", ground on 6 sides, flat within .001" with surface finish of 5 micro-inches—*5 times faster than other methods!*

Tiny watch gears, pinions and ruby bearings—flat and parallel—to a dimension tolerance of .0002".

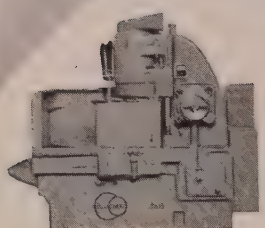


To 3 micro-inches and flat within *one* light band.

Die plates, 84" across corners and perhaps 24" thick, holding flatness to .001".



"Specs" like these call for Blanchard



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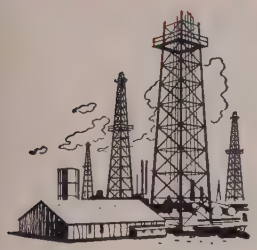
Why Alloy Steels?



Carbon steels are better today than ever before. A major producer of both carbon and alloy steels, Republic is aware of this fact. Even so, there are limits to the application of carbon steels. Machine design may restrict the size of a part. High strength may be an essential combination with light weight. Sometimes surface hardness and ductility must be held within the limits. Such are the applications in which *only* alloy steels can perform definite tasks with certainty of results at lower ultimate cost.

Take large sections—where hardness must be carried deep into the steel. Heavy crankshafts, connecting rods, piston rods, large gear and axles are examples. Here alloy steels *are necessary,* and the cost low in proportion to results. With carbon held constant, depth-hardening quality increases as the alloy content is increased.

Sometimes weight and space limitations demand that smaller sections carry heavier loads safely. For safety's sake, the answer *must be* alloy steels. Under repeated stress, high tensile strength and hardness do not necessarily indicate high fatigue properties. The load-carrying ability of a steel depends upon its alloy constituents and the form of the structure at the time it is bearing the load.

A problem of high pressures at elevated temperatures may present a problem. But alloy steels *have proved* their high resistance to creep. Some stainless alloys maintain high strength up to 1800° F. They resist oxidation—therefore do not lose their strength appreciably through reduction of section.

High elastic properties and strength may be the primary requirement, especially for welded structures. Weight reduction may be most important. In these applications, low carbon complex alloy steels *offer distinct advantages.* Such alloy steels at equal or higher yield points show low weld-hardening tendencies. Resistance to corrosion is improved. So is ductility of the weld. And retention of toughness at sub-zero temperatures, as well as creep resistance at high temperatures, is better.

To help you get the most from alloy steels, Republic offers you its unique 3-D Metallurgical Service. You benefit from the combined experience and coordinated efforts of three groups of highly-trained men—(1) the Republic Field Metallurgists; (2) the Republic Laboratory Metallurgists; (3) the Republic Mill Metallurgists. All work hand-in-hand to help you do the job you want done with alloy steels at the lowest possible cost. Ask us about this service.

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Export Dept.: Chrysler Bldg., New York 17, N.Y.

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now you can get a finish

by LAPOINTE BROACHING

far superior to any finish ever before obtainable . . .

and 400% increased tool life!

The reason? . . . smoothness of operation

through the ELECTRO-MECHANICAL DRIVE

This machine is massive, weighing something over 30 tons without tools. Slides are unusually heavy. The main drive gear, powered by a constant torque variable speed D.C. Motor, drives the broaches so smoothly that *you not only get an amazing finish but increased tool life as well.*

for HIGH PRODUCTION BROACHING

of these and other parts, you should get all the facts on this newest LAPOINTE Electric Drive Broaching Machine.

WRITE FOR BULLETIN DRVE-3

This LAPOINTE Double Ram Vertical *Electro-Mechanical Drive* Broaching Machine is producing a remarkably fine finish on S 816 steel plus 4 to 5 times greater tool life for one of *the largest manufacturers of jet blades and buckets.*

View during assembly

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CALENDAR
OF MEETINGS

ay 24-26, Automotive Engine Rebuilders Association: Annual meeting and conference booth program, Hotel Statler, Buffalo. Association address: 419 N. Capitol Ave., Indianapolis 4. Executive vice president: R. G. Patterson.

ay 24-27, National Office Management Association: International conference and office machinery and equipment exposition, Kiel Auditorium, St. Louis. Association address: 132 W. Chelten Ave., Philadelphia 44. Executive vice president: W. H. Evans.

ay 25-28, Industrial Diamond Association of America Inc.: Annual meeting, Hotel Claridge, Atlantic City, N. J. Association address: 124 E. 40th St., New York. Executive manager: Athos D. Leveridge.

ay 25-28, National District Heating Association: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association address: 827 N. Euclid Ave., Pittsburgh 6. Secretary-treasurer: John F. Collins Jr.

ay 26-27, American Iron & Steel Institute: Annual meeting, Hotel Waldorf-Astoria, New York. Institute address: 350 Fifth Ave., New York 1. Secretary: George S. Rose.

ay 27-29, Steel Kitchen Cabinet Manufacturers Association: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association address: Engineers Bldg., Cleveland 14. Executive secretary: Arthur J. Tuscany Jr.

May 31-June 11, Canadian International Trade Fair & National Air Show: Exhibition Park, Toronto, Canada. Director of the Trade Fair: Glen Bannerman.

une 3-5, Electric Metal Makers Guild Inc.: Annual meeting, Moraine-on-the-Lake, Highland Park, Ill. Guild address: Box 6026, Mt. Washington Sta., Pittsburgh, Pa. Secretary-treasurer: C. B. Williams.

une 6-9, American Gear Manufacturers Association: Annual meeting, The Homestead, Hot Springs, Va. Association address: 302 Empire Bldg., Pittsburgh 22. Executive secretary: J. C. Sears.

une 7-10, Society of the Plastics Industry Inc.: National plastics exposition, Public Auditorium, Cleveland. Society address: 67 W. 44th St., New York 36. Executive vice president: William T. Cruse.

June 9-11, American Society for Quality Control: Annual convention and exhibit, Hotel Jefferson, St. Louis. Convention manager: Wade R. Weaver, Republic Steel Corp., Republic Bldg., Cleveland.

June 10-11, Magnesium Association: Mid-year meeting, Seigniory club, Montibello, Quebec, Canada. Association address: 122 E. 42nd St., New York. Assistant secretary: Martha I. Hansen.

June 13-16, American Boiler Manufacturers Association & Affiliated Industries: Annual meeting, The Homestead, Hot Springs, Va. Association address: 1571 W. 117th St., Cleveland 7. Secretary: A. C. Baker.

June 13-17, National Industrial Service Association Inc.: Annual meeting, Hotel Statler, Detroit. Association address: 818 Olive St., St. Louis. Information: Horace Barks.

June 13-17, National Association of Cost Accountants: International cost conference, Hotel Conrad Hilton, Chicago. Association address: 505 Park Ave., New York 22. Secretary: A. B. Gunnerson.

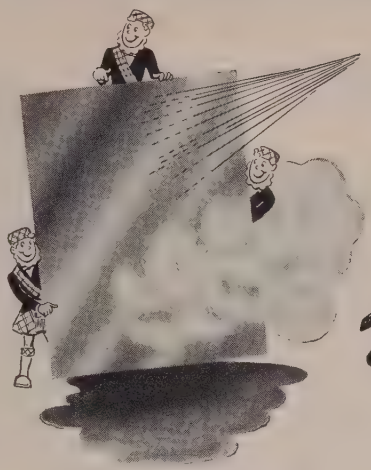
June 13-18, American Society for Testing Materials: Annual meeting and exhibit, Hotels Sherman and Morrison, Chicago. Society address: 1916 Race St., Philadelphia 3. Executive secretary: Robert J. Painter.

June 14-15, Malleable Founders' Society: Annual meeting, Seigniory Club, Quebec, Canada. Society address: 1800 Union Commerce Bldg., Cleveland 14. Managing director: Lowell D. Ryan.

June 14-17, American Society of Mechanical Engineers: Oil and gas power conference, Muehlebach hotel, Kansas City, Mo. Society address: 29 W. 39th St., New York. Secretary: C. E. Davies.

June 16-18, Committee on Vacuum Techniques: High Vacuum Symposium, Berkeley-Carteret hotel, Asbury Park, N. J. Committee address: Box 1282, Boston 9.

Extra corrosion resistance—



Type 316 stainless is now available in MicroRold®!

Cut your job costs by ordering *Washington Steel MicroRold* Type 316 stainless steel. Remember, job costs are figured on a square foot basis—while material is bought by weight. Why pay a premium for stainless surface area by receiving material on the heavy side of the gauge you order? Special equipment at Washington Steel assures accurate "thinness control" on MicroRold . . . and you can specify that your MicroRold Type 316 be rolled to the light side of the gauge range. You'll save money!

MicroRold Type 316 Stainless is available as follows:

SHEETS

Max. 36" wide	No. 4 and No. 7 Finish	.012 to .109
Max. 36" wide	2B and 2D Finish	.005 to .078
Max. 36" wide	Physicals—(average)	

Condition	Annealed
Ultimate Tensile Strength P.S.I.	85,000
Yield Strength (.2% set) P.S.I.	40,000
Elongation in 2 inches, %	55
Rockwell Hardness	B 75-80
Scaling Temperature, °F	1700
Grain Structure	Austenitic-Nonmagnetic

STRIP

.005 to .078, in No. 1 and No. 2 Finish
.0015 to .009 (Veri-Thin), up to 23 15/16" wide, Bright Annealed

Ask your steel warehouse distributor about MicroRold Type 316 Stainless—widely used throughout the chemical industry and wherever applications must resist salt spray, damaging industrial fumes, acid salts and reducing acids. It will pay you to get full details now!

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"brings the BOSTON Gear plant to you" — the benefits of a 75-year experience — the engineering counsel of transmission planning experts — full stocks of BOSTON Gear Products — and FACTORY PRICES!

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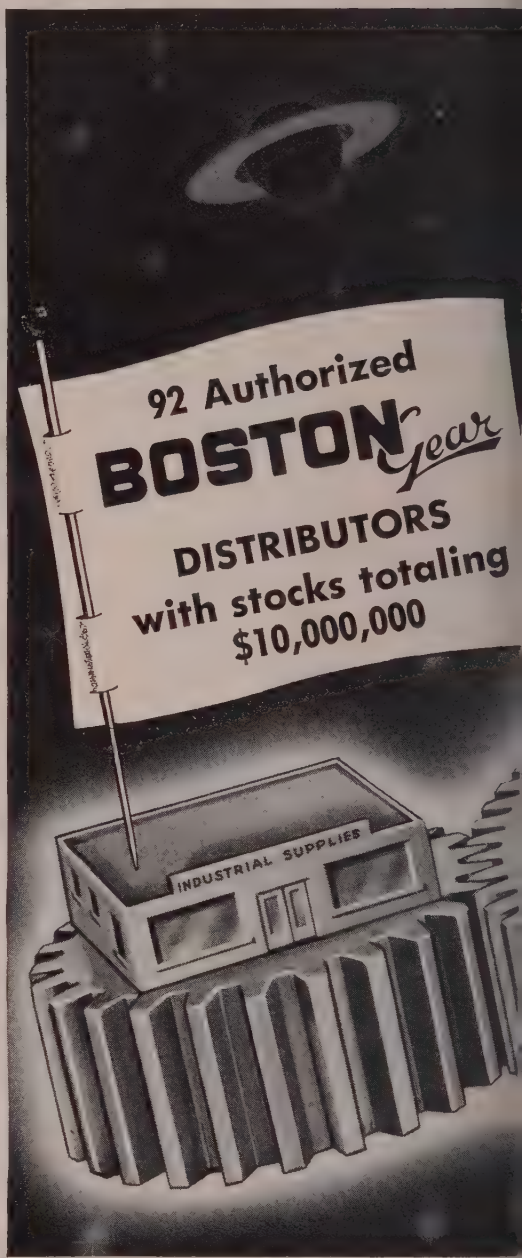

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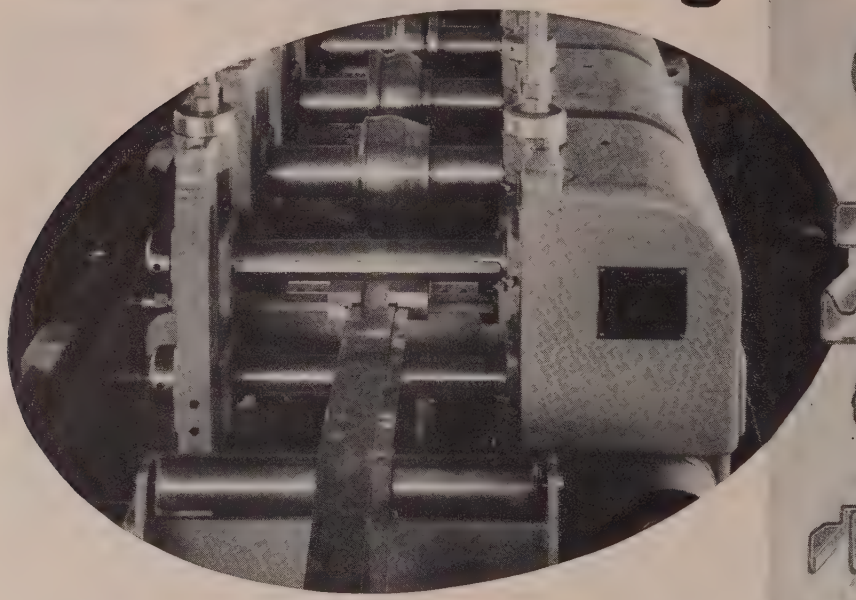

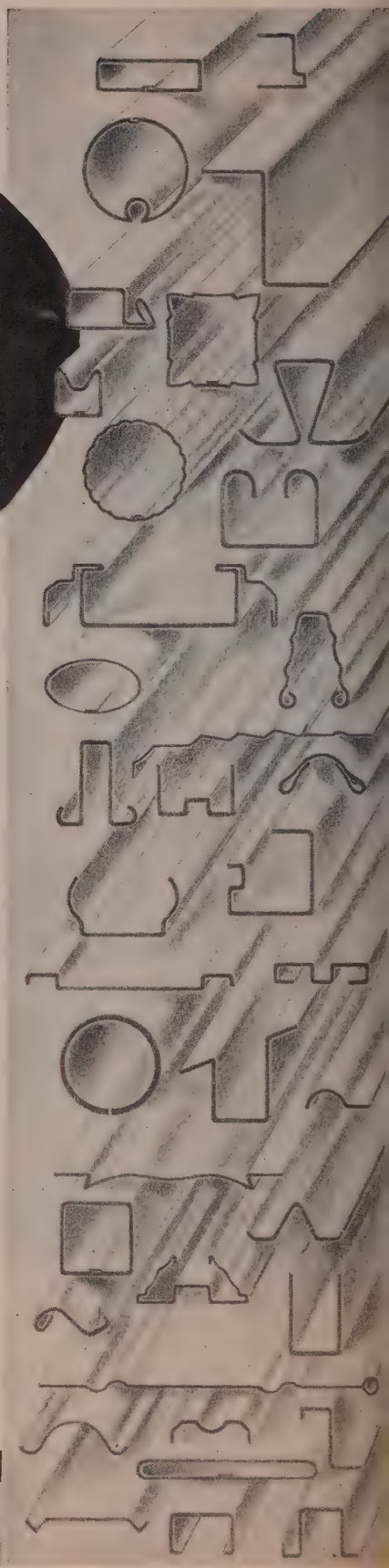

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One of the advantages CleCap customers enjoy is the knowledge that when they want some of those BIG cap screws, the chances are 9 out of 10 we can ship them the same day.

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30 P&H TH-200 high-frequency machines make inert gas arc welding 2½ to 3 times faster than former gas welding at Republic Aviation Corporation

No replacement maintenance in three and a half years of two-shift operation

You don't have to take our word for the outstanding performance record of P&H Welders. The following statements are actual quotes from a certified report issued by the H. P. Gould Co. of Chicago, who made an impartial study of welding operations at Republic Aviation Corporation, Farmingdale, L. I., N. Y.

"In the building of faster and better aircraft, new developments in welding have played an important part and P&H high-frequency inert gas welding has proved that it can solve the problems of welding aluminum alloys.

"Three and a half years ago, Republic Aviation tested P&H TH-200 HF Inert Gas AC Arc Welders, and evaluated them against the existing equipment in the plant, as well as against outside competition.

"P&H welders of four different types are now used in four locations in the plant, for the welding of hundreds of different parts. In general, they are welding aluminum alloys from .032" thickness up to .250", and heat-resisting alloys from .010" up to a thickness of .093". For arc-welding alloy steels (4130, 4140, 8630, 8740, etc.), experience has proved P&H electrode AW-4 most satisfactory, and it is used exclusively.

"Republic Aviation welding engineers back up the claim of the makers that P&H welders require very little maintenance. The 30 high-frequency arc welders have had no replacement maintenance whatever in three and a half years of two-shift operation — and the operating cost of each P&H TH-200 HF Welder is only 40¢ per day."

Like Republic Aviation, whose studies show P&H inert gas arc welding to be 2½ to 3 times as fast as former gas welding you, too, can enjoy the money-saving advantages of P&H Arc Welders with Dial-lectric Control. You, too, can get faster, better welds at lower cost.

We've given you the Republic Aviation story in a nutshell! You can get all the detailed facts and figures by reading Gould Report No. 5311. Write for your copy today.

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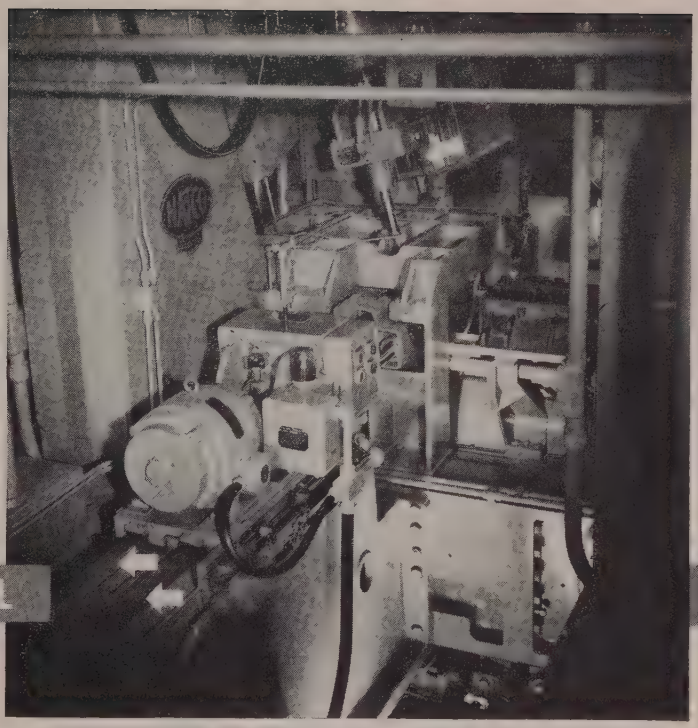
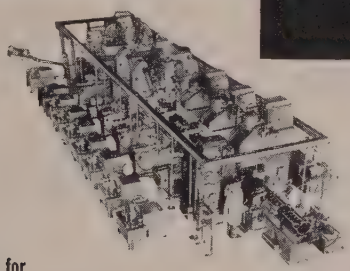
50 Auto Blocks An Hour!

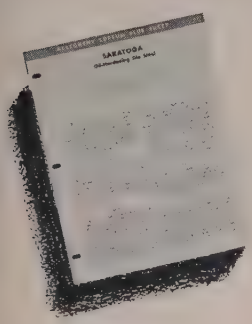
WITH THE HELP OF LUDLUM SARATOGA TOOL STEEL





Ludlum Saratoga was used for the steel ways (note arrows, above) of this giant unit, illustrated at left in a bird's-eye view reduced to miniature size.

Write for BLUE SHEET ON SARATOGA



This concise four-page folder gives all needed handling and shop treatment details on Saratoga. Included is certified laboratory information on physical characteristics, and complete data on forging, annealing, hardening, tempering, etc. *Ask for your copy.*

Address Dept. S-531

98 SEPARATE OPERATIONS are carried on by this versatile machine which turns out 50 V8 auto engine blocks an hour. It consists of 18 machining units, each of which is fitted with hardened and ground steel ways of Ludlum Saratoga to guarantee accuracy in production.

MILLING, TREPANNING, DRILLING, counterboring, reaming, chamfering, automatic inspection of holes for depth and removal of chips are the operations performed by this amazing mechanism.

LUDLUM SARATOGA WAS USED BECAUSE its extreme hardness, high resistance to wear, and excellent machinability more than met the customer's high requirements for maintaining accuracy in this huge, multi-station machine.

ALLEGHENY LUDLUM METALLURGICAL SERVICE can solve *your* tool or die steel problems. ● Call your local A-L representative or distributor today, or write *Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pennsylvania.*

For complete **MODERN** Tooling, call

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Attention Chrome Platers!

from these little pellets... big profits can grow!

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UDYLITE'S ENTIRELY NEW, CHEMICALLY DIFFERENT ADDITIVE

Mist and spray problems are over—when you add ZERO-MIST to your chrome plating bath. Its "magic" cuts your chromic acid waste up to 70%. It automatically, drastically reduces drag-out losses too!

Watch your profits grow when you add ZERO-MIST. This wonderful, cost-cutting chemical is a 6-way performer, and that pays for itself a hundredfold. Put it to work today!

A BOX OF FACTS ABOUT ZERO-MIST

The convenient little pellets will do these things for you:

1. Completely eliminate chromic acid mist and spray!
2. Reduce film drag-out losses by 50% or more!
3. Sharply reduce rinsing requirements and rinse contamination!
4. Eliminate the necessity for water wash systems!
5. Eliminate spray contamination of other solutions!
6. Eliminate, often completely, chromic acid stains!

ZERO-MIST is indestructible — only infrequent drag-out replacement additions are necessary.

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PLATING SUPPLIES

"Top the Field"

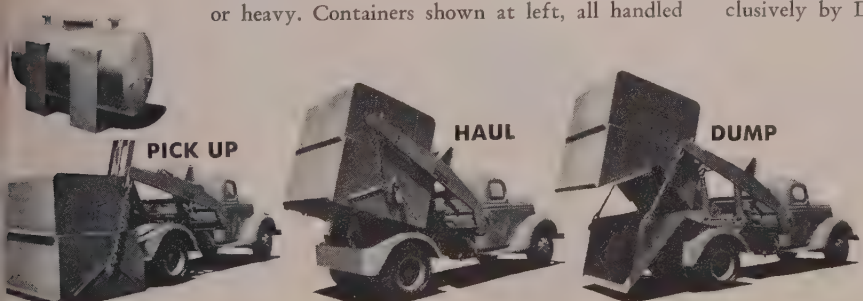
DETROIT 11, MICHIGAN

You will Dump High Costs, too..

. . . when you install the Dempster-Dumpster System of Bulk Materials Handling

Manufacturers over the nation have learned to eliminate the costly and inefficient method of handling bulk materials with conventional dump trucks, drivers and loading crews. You can equip one truck with a hydraulically operated Dempster-Dumpster. Then, inside or outside buildings at convenient accumulation points, you simply place detachable Dempster-Dumpster Containers, in capacities up to 4 times that of conventional dump truck bodies, with each designed to suit the materials to be handled—be they solids, liquids or dust . . . hot or cold . . . bulky, light or heavy. Containers shown at left, all handled by one Dempster-Dumpster, are only a few of the many available or that can be built to meet your needs. The Dempster-Dumpster, operated by only one man, the driver, serves scores of containers . . . one after another, as shown below.

You eliminate trucks standing idle. You eliminate re-handling of materials. You eliminate loading crews. You increase efficiency, sanitation and good plantkeeping with this Dempster-Dumpster System—the lowest cost method of bulk materials handling ever devised. Write to us for complete information. Manufactured exclusively by Dempster Brothers, Inc.



THE DEMPSTER DUMPSTER SYSTEM

DEMPSTER BROTHERS, 654 Dempster Bldg., Knoxville 17, Tennessee

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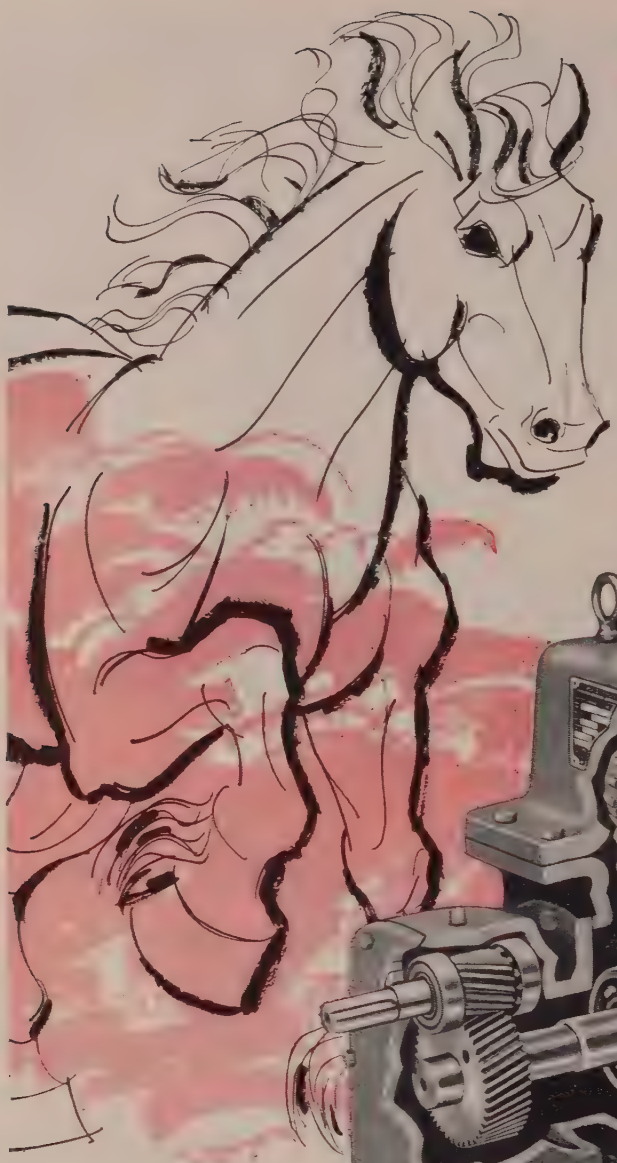
FOR TOUGHEST DAILY SERVICE

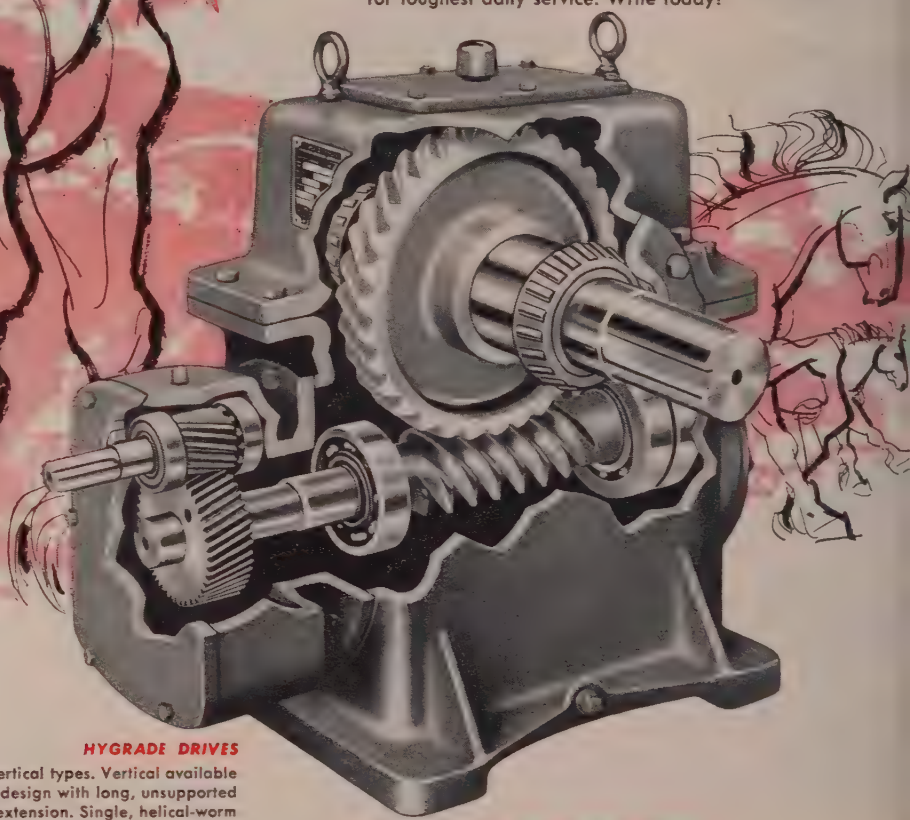
FOOTE BROS. Enclosed Gear Drives

It takes plenty of muscle to meet industry's demands for sure, dependable power transmission . . . rugged design, trouble-free operation, high load-carrying capacity, top efficiency and longer life. This is the kind of service industry expects—*and gets* from Foote Bros. Enclosed Gear Drives, day after day, year in and year out.

In the famous, job-proven Foote Bros. line of enclosed gear drives, you will find a wide variety of sizes and types to meet any industrial service. See Foote Bros. *first* . . . for performance you can measure, quality you can trust.

WRITE FOR COMPLETE DETAILS . . . on how Foote Bros. Enclosed Gear Drives can meet your needs for toughest daily service. Write today!





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Horizontal and vertical types. Vertical available in Hytop design with long, unsupported output shaft extension. Single, helical-worm (illustrated)and double-worm reductions in ratios up to 4108 to 1; capacities up to 260 h.p.

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Better Power Transmission Through Better Gears

Manufacturers of Duti-Rated Lifetime Gears, standard gears, enclosed gear drives of all kinds, gear motors, aircraft-quality gears and actuators, and special machinery . . . the world's finest since 1859.

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Compact housings, specialized heat-treatment for gearing and improved accuracy of gear tooth generation mean longer, trouble-free performance. Ratios up to 360 to 1; capacities up to 1550 h.p.

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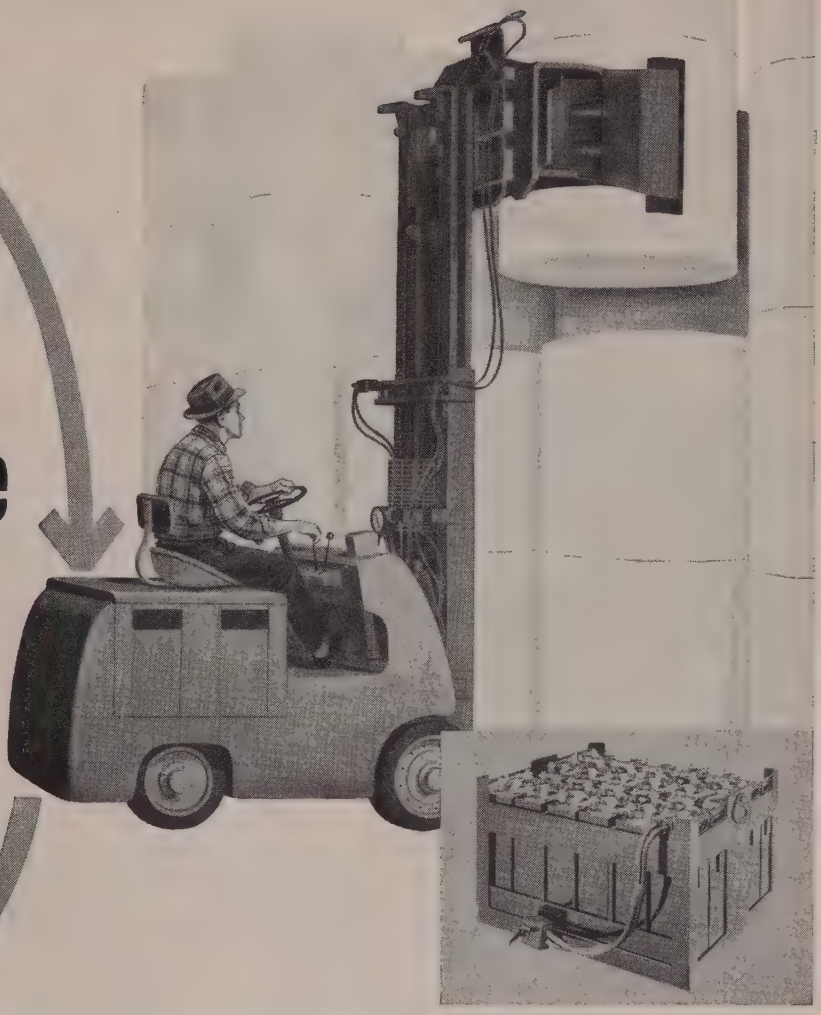
Incorporate higher capacity, space saving, longer life *Duti-Rated Lifetime Gears*. Available in double and triple reductions with ratios from 5 to 1, up to 238 to 1; capacity range from 1 up to 200 h.p.

FOOTE BROS. GEAR AND MACHINE CORPORATION • 4545 SOUTH WESTERN BOULEVARD • DEPT. I • CHICAGO 9, ILLINOIS

news for industrial truck owners!

Now... 25% more capacity here



... with the New EDISON "MC" type Battery!

pecifically designed to provide ore power for modern driver-ride, t-down fork trucks, this newest DISON battery development pro- ides *25% more capacity* than ever efore available in nickel-iron-alka- ne batteries . . . to suit the limited attery compartments of such in- ustrial trucks. Extra power too, for perating various hydraulic devices hich speed handling in plants and arehouses.

Besides this unusual space- apacity ratio, the new "MC" offers all of the profitable features that are typical of EDISON Nickel-Iron-Alkaline Storage Batteries: steel plates and cell containers for the most rugged, long-life service—electrical characteristics that assure foolproof operation and outstanding dependability.

And like all EDISON batteries, the new "MC" is designed and built to give *more than twice the performance life* of other type batteries. Be sure to investigate this new EDISON development today!

If you operate battery electric industrial trucks, or are planning to purchase one soon, be sure to have the complete facts on the new EDISON "MC" type battery. Clip the coupon below and mail it today.

Edison Storage Battery Division
Thomas A. Edison, Incorporated
512 Lakeside Avenue
West Orange, N. J.

I'm interested in the new MC battery—

☐ Send me complete literature

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Most dependable power... lowest over-all cost
ou get both with an EDISON

EDISON

Nickel • Iron • Alkaline
STORAGE BATTERIES

DISON ALSO MAKES THE FAMOUS "V.P." VOICEWRITER AND THE TELEVOICE SYSTEM

Back-up roll bearings of

get effective lubrication

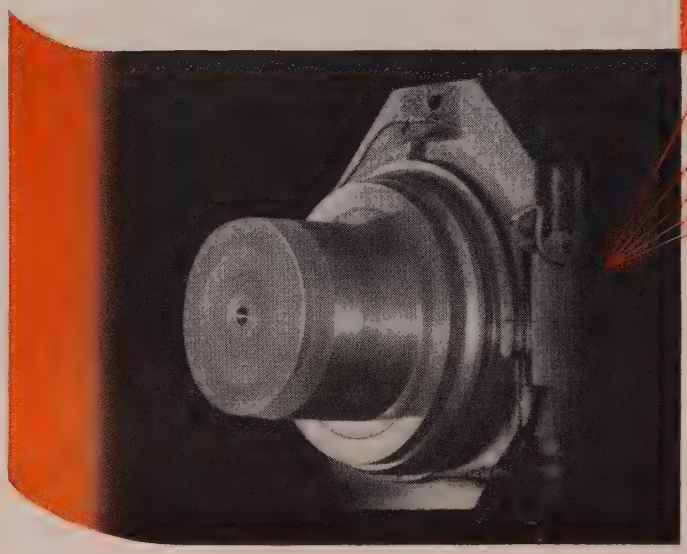
with GULF I-C

Back-up roll bearings of this cold strip mill at U.S. Steel's new Fairless Works, the world's fastest, require the best possible lubrication to withstand heavy loads over a long period of time. The strip shoots through the rolls at speeds up to 7000 feet per minute.

Gulf I-C Oil provides the effective lubrication that is needed here. This stable oil has excellent water separating characteristics, and resists sludge formation. These important advantages—plus outstanding lubricating qualities—contribute to continuous operation and lower maintenance costs.

Gulf I-C Oil was also selected to lubricate the back-up roll bearings of the new and efficient hot strip mill at the Fairless Works.

Whether your mill operates at a speed of 7000 or 700 feet per minute, make your next order for a roll bearing lubricant an order for dependable, efficient lubrication by specifying Gulf I-C Oil. Call your nearest Gulf office today and ask a Gulf Sales Engineer to recommend the proper grade for your equipment.



world's fastest cold strip mill

OIL

GULF INDUSTRIAL LUBRICATION

Gulf Oil Corporation • Gulf Refining Company

1822 Gulf Building, Pittsburgh 30, Pennsylvania

NEW PROTECTIVE COATING CHEMICAL FOR ALUMINUM

ALODIZING

Alodizing with "Alodine,"* a new technique in the protective coating of aluminum, was made available for production-scale use in 1946. Since that time Alodizing has largely supplanted the more elaborate, costly and time-consuming anodic treatments in the aircraft and other industries.

Continuous and successful industrial use has clearly demonstrated the simplicity and economy of the Alodizing process as well as the effectiveness of the "Alodine" amorphous coatings, particularly as a base for paint. In fact, the paint-bond that Alodized aluminum provides has been found to be superior to that possible with chromic acid anodizing.

The corrosion-resistance of unpainted aluminum Alodized with "Alodine" Nos. 100 or 300 is excellent, easily meeting the requirements of Specification MIL-C-5541. However, a need for protection of unpainted aluminum, even better than that obtained with chromic acid anodizing, has long been recognized.

NEW IMPROVED "ALODINE" DEVELOPED By ACP RESEARCH CHEMISTS

Several years of intensive research have now led to a new type of "Alodine," designated as "Alodine" No. 1200. This new protective coating chemical forms an amorphous mixed metallic oxide coating of low dielectric resistance that provides unusually high corrosion-resistance for unpainted aluminum. In addition, it forms an excellent paint bond that approaches closely the high quality obtained with the earlier types of "Alodine."

After having been tested for conformance with Specification MIL-C-5541, "Alodine" No. 1200 is now about to go into production.

PROCESS DETAILS

"Alodine" No. 1200 is the only essential chemical needed to prepare the coating bath and the final rinse bath. One of its unique features is that it can be used in tanks in an immersion process, or, in a multi-stage power washer in a spray process, or, with a slight adjustment of pH, with brush or portable spray equipment in a manual process. This means that even where the simple production equipment is not available, or where touching up of damaged coatings previously Alodized or anodized is required, excellent protection and paint bonding can still be obtained with practically no equipment.

All three methods of application easily meet the requirements of Specification MIL-C-5541.

Process sequence for all three methods of application is the same as for other standard grades of "Alodine" such as Nos. 100, 300, and 600, viz.: 1. Pre-cleaning. 2. Rinsing. 3. Alodizing. 4. Rinsing. 5. Acidulated rinsing. 6. Drying.

Coating time in an immersion process ranges from 2 to 8 minutes and in a mechanized spray process is about 30 seconds. "Alodine" No. 1200 baths are operated at room temperatures (70° to 100°F.) and heating is required only if the bath has gotten cold after a "down" period.

RECOMMENDED USES FOR "ALODINE" No. 1200

"Alodine" No. 1200 is specifically recommended for coating wrought products that are not to be painted or are to be only partially painted; and for coating casting and forging alloys whether or not these are to be painted. "Alodine" Nos. 100 and 300 are still recommended for coating wrought products such as venetian blind slats, awnings, etc., that are invariably painted.

RESULTS OF TENSILE TESTS

This new "Alodine" not only retards visible corrosion and pitting, but as shown in the table below, the loss of ductility with "Alodine" No. 1200, both brush and dip after 1000 hours salt spray was less than for chromic acid anodizing after 250 hours, and for "Alodine" No. 100 and a conventional chromate treatment after 168 hours exposure.

PROCESS	SALT SPRAY EXPOSURE	COMPLIANCE WITH TENSILE REQUIREMENTS OF MIL-C-5541
CHROMIC ACID ANODIZING	168 hrs.	passes
	250 hrs.	passes
	500 hrs.	fails
	1000 hrs.	fails
BRUSH "ALODINE" No. 1200	168 hrs.	passes
	250 hrs.	passes
	500 hrs.	passes
	1000 hrs.	passes
DIP "ALODINE" No. 1200	168 hrs.	passes
	250 hrs.	passes
	500 hrs.	passes
	1000 hrs.	passes
DIP "ALODINE" No. 100	168 hrs.	passes
	250 hrs.	fails
	500 hrs.	fails
	1000 hrs.	fails
CONVENTIONAL CHROMATE TREATMENT	168 hrs.	passes
	250 hrs.	fails
	500 hrs.	fails
	1000 hrs.	fails

*"Alodine" Trade Mark Reg. U. S. Pat. Off.

CHEMICALS ACP PROCESSES

AMERICAN CHEMICAL PAINT COMPANY

General Offices: Ambler, Penna.

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SIMONDS Flat Ground DIE STEEL

...OIL or AIR Hardening

Ready for 1001 uses, Simonds "Red Streak" Die Steel offers you a choice of either OIL or AIR Hardening. Made from Simonds own steel, it's precision ground to a thickness limit of plus or minus .001", and has an extra smooth surface finish of 25 to 35 micro inches. Edges and ends are square and parallel, with all scale, decarburation and surface defects removed. All sizes come individually packaged with heat treating instructions.

SIMONDS OIL HARDENING DIE STEEL
(non-deforming Molybdenum Type) is uniformly annealed for easy machining and uniform hardening. Due to its wide hardening range (1450 to 1540) good results are assured with even the simplest heat treating equipment. Stock sizes are available from 1/64" to 3" thick and 1/8" to 14" wide in 18" lengths. The heavier sizes also come in 36" lengths.

SIMONDS AIR HARDENING DIE STEEL
(non-deforming 5% Chrome Type) is spheroidize annealed for good machinability and uniform hardenability. Its wide hardening range (1700 to 1800 F) makes it practically foolproof in heat treating. Stock sizes run from 1/2" to 2" thick and 2" to 10" wide in 36" lengths.

Your Simonds Distributor carries many sizes in stock — can promptly obtain any desired size. Try some on your next job.

SIMONDS SAW AND STEEL CO.
FITCHBURG, MASS.

Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon
Canadian Factory in Montreal, Que.
Simonds Divisions: Simonds Steel Mill, Lockport, N. Y.
Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada

What are you getting for your steel dollar?

In quality of product

—steel of known, uniform quality which you can reorder with confidence

—steel accurate as to size and gauge

—steel carefully stored and handled so it reaches you in prime condition

—assurance of correct weight

In value of service

—clean, accurate cutting, eliminating need for further processing

—constructive advice on steel problems

—quick delivery—within hours when needed

In character of supplier

—wide range of steels with quantity differential economies

—fair prices in times of scarce or plentiful supply

—unprocessed material returnable

—settlement of differences to your complete satisfaction

—the interest and ability to carry you in times of difficulty

Only if your steel dollars buy a *complete* steel service will your dollars return full value. We have been serving industry with good sound steel from stock for over one hundred years. We stand ready to work with you whenever you call.

Principal products in stock: bars, structurals, plates, sheets, tubing, alloy and stainless steel, reinforcing steel, etc., also machinery and tools.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI • CLEVELAN
DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTL

STEEL
May 24, 1954

Metalworking Outlook

Controls on Nickel?

The nickel shortage is as disturbing as ever, and the talk grows louder that controls will be reimposed, perhaps by the end of May. But if government curbs return, there will probably be no flat ban on any particular types of end use. Contributing to the seriousness of the problem is the heavy demand from platers for more nickel and the diversion in the past months of the output of Cuban mines to the stockpile.

The Metal Roundup

Except for nickel, the metal supply situation is the best in 15 years from the consumers' viewpoint. Aluminum supplies continue to be ample, and primary prices are stable. There's plenty of copper, too, but there may be price drops when the Chilean deal finally comes through. Demand for lead is sluggish; look for government price-propping later in 1954. Bulging U. S. stockpiles depress the tin market. Zinc supplies are far ahead of demand; prices are at near-bottom now.

Steel Strike? Not Worried

There's plenty of steel, too, of course. And consumers are betting there will be no steel strike, so consequently they are not boosting orders substantially as a hedge against a walkout. Some sales people had hoped there might be more strike-insurance buying. Purchasing agents' judgment on the matter seems sound, at least on the basis of last week's initial labor-management talks. The U. S. Steel Corp. meetings with the union were particularly genial.

Local 12 Takes Another Flier

Local 12, UAW-CIO, has another unusual proposal. The bargaining agent for Willys Motors Inc., Toledo, O., has offered to take the Kaiser-Willys sales franchise for Ohio to help keep sales high. Edgar Kaiser, president of the parent Kaiser Motors Corp., calls the offer "highly commendable" and says it's under consideration. The union pledged $300,000 and Toledo businessmen additional sums to form Ohio Services Inc., which would handle the distribution. In April, Local 12 voted to eliminate an incentive pay plan which, at least for the time being, means a pay reduction to members of up to 10 per cent.

NLRB Rules Twice

National Labor Relations Board has come up with two especially significant decisions. One, involving CIO textile workers and a textile company, rules that a union's use of slowdowns and other unprotected harassing tactics during negotiations constitutes a refusal to bargain and violates the Taft-Hartley Act. The second, involving AFL machinists and Stanley Works, New Britain, Conn., decrees that it's an unfair labor practice for

Technical Outlook—p. 95 The Market Outlook—p. 141

an employer to conduct a vote by mail to determine whether a majority of employees favor a strike, even if the vote is secret and conducted by an independent certified public accountant.

A Monday Holiday

Most metalworking companies are making Monday, May 31, a paid holiday because Memorial Day this year falls on a Sunday (May 30). Since 1946, Memorial Day has been one of the six paid holidays commonly recognized by most of industry. The others are New Year's Day, Independence Day, Labor Day, Thanksgiving Day and Christmas. Thus far, organized labor has had little success in winning additional holidays, although a scattering of companies grant pay for not working on Washington's Birthday, Lincoln's Birthday, Yom Kippur, Election Day or Good Friday.

Job Prospects: Good

The proportion of jobs in manufacturing will be greater in the future than in the past, predicts Council for Technological Advancement, affiliated with Machinery & Allied Products Institute. About 25 per cent of the total labor force is engaged in manufacturing today, compared to less than 20 per cent before World War II. The requirements for skilled labor will also rise, CTS says. The proportion of the labor force in unskilled jobs has dropped from 36 per cent in 1910 to less than 20 per cent today. Women, especially those over 45, will constitute a growing proportion of the labor force. The expansion has been from 21 per cent of all American workers in 1920 to 30 per cent in 1953 and will perhaps be 33 per cent by 1975.

Price Flips in Motors

Motor manufacturers are disturbed by unsettled price conditions for their product. At least one large producer has been quoting reduced prices on some quantity orders for integral horsepower motors purchased by original equipment manufacturers. Primarily affected are motors in the 1 to 15-hp range.

Straws in the Wind

Federal Reserve Board's industrial production index stood at 123 per cent of the 1947-1949 average in April, two points below March output and 13 points under year-ago production. . .Dismal color TV sales may brighten when the industry goes to a 19-inch tube. . .Gisholt Machine Co., Madison, Wis., joins the growing list of machine tool builders offering a leasing plan. . .Norton Co., Worcester, Mass., has instituted net pricing for its grinding wheels.

This Week in Metalworking

Prefabricated housing manufacturers say they'll produce a banner 75,000 units in 1954 (p. 55). . .How to do new things with old materials and how to utilize the new materials being developed was demonstrated at the basic materials show in Chicago last week (p. 56). . .Industrial supply sales in 1954 may be off 10 per cent from the record $4.3 billion in 1953 (p. 57). . .Some of management's opinions about the guaranteed annual wage begin on p. 58. . .Second-quarter business for industrial furnacemakers should improve over the volume in the first period (p. 61).

If you make, move or market
METAL PRODUCTS

These can be your most valuable tools

YALE Trucks and Hoists are the modern handling tools of modern industry. They can do all of your lifting, moving, and stacking jobs . . . increase efficiency in production, storage, and plant maintenance.

Choose from YALE's complete line of Electric or Gas Trucks—or the wide line of Hand and Electric Hoists . . . you'll get the time and work-saving equipment that can cut your handling costs in half, then in half again.

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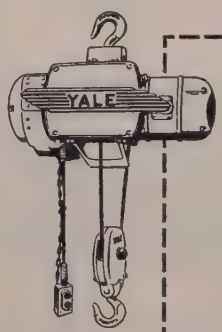

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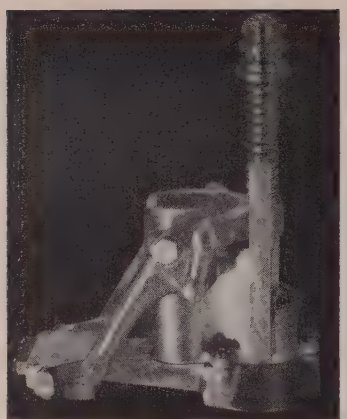
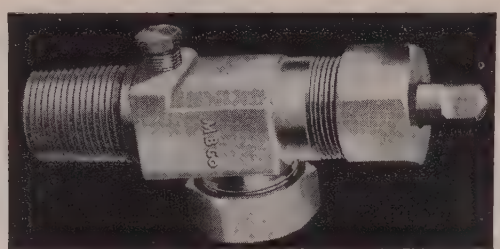


Durable . . . bottle-capping unit uses cast Nickel-Silver. (Courtesy of Universal Castings Corp., Chicago, Ill.)



Corrosion-resisting . . . chlorine gas cylinder valve body of Nickel-Silver. (Courtesy of Mueller Brass Co., Port Huron, Mich.)

Nickel-Silver

A Glamour Metal for Many Uses

Durable...yet easy to cast or fabricate, machine and polish

Economy and speed of fabrication plus low maintenance cost make Nickel-Silver an excellent material for "appearance" castings whether subject to considerable handling, rubbing and scouring in service, or merely standing idle for decorative purposes...

Or . . . wherever you wish the corrosion resistance, or the beauty of lustrous copper-nickel-zinc alloys whose silvery white color lends permanent richness to your product.

Applications include chandeliers, balustrades, ornamental grills, doors, railings and banisters for architectural artistry ...hinges, locks, door handles, dining car hardware, shipboard trim, deck fittings, household plumbing fixtures, laundry machine parts, soda fountain fittings, packaging, bottling and similar machinery, scale and typewriter components and thousands of other articles.

Increase your product acceptance and at the same time improve quality and cut costs... by using one of the standard grades of Nickel-Silver best suited to your needs. Additional information on these versatile alloys is yours for the asking . . . write for a copy of our bulletin, "Nickel-Silver Castings," now.

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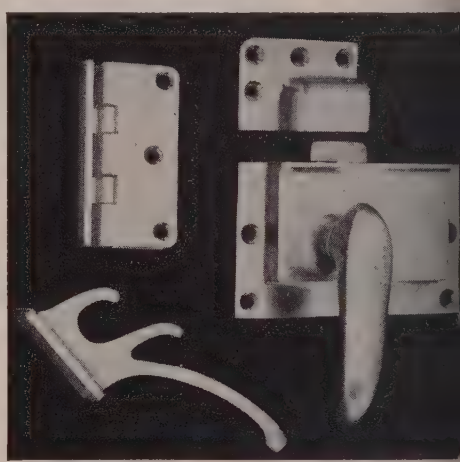

Silvery white . . . wear-resistant Nickel-Silve fixtures for railway passenger cars. (Courtesy o Loeffelholz Co., Milwaukee, Wisc.)

Readily cast . . . packaging machiner components of Nickel-Silver. (Courtesy o Arthur Harris & Co., Chicago, Ill.)

Versatile . . . Nickel-Silver used in cast valv for meat-packing machine. (Courtesy of Lakesid Bronze, Inc., Buffalo, N. Y.)

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREE NEW YORK 5, N. Y

Timely Decision

History was made last Monday when the United States Supreme Court ruled that segregation in public schools is unconstitutional. This ranks with the Dred Scott decision of 1857 and the emancipation of slaves by President Lincoln in 1863 as one of the great events in the development of true democracy in our country.

The action of the high court could not have come at a more opportune time. It neatly pulls the rug from under one of the Kremlin's most effective propaganda stunts. No longer can the Reds exploit discrimination against Negroes as one of the capitalistic system's great crimes. Somebody has said, with good reason, that last Monday's decision, in terms of world prestige value, is worth as much as a Western victory in Indo-China.

Just as the metalworking industry has played an important role in the affairs of American Negroes in the past, so it will to an increasing extent in the future. Early in the century Judge E. H. Gary of United States Steel Corp. commissioned George Gordon Crawford to build a few communities for the families of white and colored employees of its subsidiary, Tennessee Coal, Iron & Railroad Co. Crawford called in the nation's foremost authorities on schools, housing, medical care, etc. and did such a wonderful job of providing incentives for better living that he was hailed as the first citizen of Birmingham by public acclamation. This was one of industry's first experiences with the racial problem on a grand scale.

During World War I tens of thousands of Negro workers from below the Mason-Dixon line came to northern cities to take jobs in munitions plants. This was the beginning of an exodus that to date has not been reversed. The ability of the Negro to earn more money in the North and to improve his station in life has been one of the things that led to last Monday's important decision. Had these Negroes remained in the South these 30 years, that decision never would have been rendered.

Industry has played an important role in this great problem. It can face the challenge of the future with confidence.

E. L. Shaner

EDITOR-IN-CHIEF

MORE BUILDING AHEAD: Many persons who will think of the momentous decision against segregation in public schools as a social problem, probably will realize sooner or later that the action of the Supreme Court eventually will result in drastic changes in the

physical layout of schools. No matter what decision the southern states arrive at as a result of the court's ruling, it is a foregone conclusion that after an indefinite period of uncertainty and litigation, southern school authorities gradually will conform to the requirements of the supreme law of the land.

What this will mean in terms of brick, mortar and equipment cannot be estimated at this early stage. However, it is not too fantastic to predict that the economic developments resulting from the antisegregation decision will be far more constructive than many observers now anticipate.

* * *

TRICKLE-UP HAS MERIT: Leftists—including former President Truman, CIO leader Walter Reuther and the official line of the Communist party—ridicule every attempt of the Eisenhower administration to introduce long-overdue tax reforms as the "trickle-down theory" which consists largely of "handouts to the rich." These leftists are for higher tax exemptions for individuals, more reckless government spending and inflation.

A good answer to this demagoguery was presented by Roger M. Blough, vice chairman of United States Steel Corp., before a medical society in Atlantic City on May 17. As against the much publicized "trickle-down theory" he advocates the "trickle-up process." He asserts that money first must be invested at the bottom before it can benefit others. His argument is that unless a sound relationship between risk capital and dividend profits can be protected, corporate efforts to employ more workers, to build more and better plants with new machines cannot be realized.

* * *

NORMAL IS NOT BEST: Every now and then many of us run into a situation where an individual—totally unaware of the fact he is under public scrutiny—makes an offhand statement that is so typical of what the average American believes that it gains widespread publicity in the nation's press.

Something in this category happened at the annual meeting of Republic Steel Corp. Tom Girdler, chairman (p. 74), said that one of his Republic stockholder friends asked him when he expected business to return to normal. Tom countered with the query, "What do you consider normal?" Without hesitation the questioner replied, "Why, the best year I've ever had."

Isn't this a pretty good indication of what ails many of us? We have become so accustomed to 105 per cent of capacity operations that we have completely forgotten that 80, 85 or 90 per cent is much more profitable and certainly more "normal."

* * *

FORD SHOWS THE WAY: Most readers of this page have attended one or more plant inspection tours. In most cases, the host company assigns trained guides to groups of 15 to 30 visitors. As each group walks through the plant, some of its members lag behind because they see something of special interest; others speed up to see what is ahead.

Two weeks ago, when the American Foundrymen's Society was holding its convention in Cleveland, one of the featured treats was a tour of Ford's fabulous mechanized foundry. Ford executives, knowing that a thousand or more foundrymen would descend upon them on Friday, (p. 61) decided that the orthodox guided group system would not work. Instead, they clearly marked the route visitors were to follow and then stationed their guides and department heads at key positions to answer questions.

This technique paid off handsomely. Every manufacturer who is contemplating an "open house" or plant inspection tour should weigh the advantages of this plan.

* * *

SERVES INDUSTRY WELL: Now that construction of the St. Lawrence waterway is practically assured (p. 65), more attention will be given to what cheap water transportation means to industry. Few people realize that the Great Lakes with their large fleet of bulk carriers constitute the most efficient and largest volume transportation system of the world.

One could get a good idea of this activity by flying over the Detroit river or over the Soo locks at Sault Ste. Marie. An idea of how another water system serves American industry could be gained by observing traffic in the lower Allegheny and Monongahela and upper Ohio rivers. In Europe a similar scene can be observed from a plane flying over the Moselle, Main and Rhine rivers—particularly from Frankfort and the Saar down to the Ruhr.

A deep inland water channel can be of great service to industry.

Bump that assures positive results

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'he growing popularity of the highly effective pow- ered dry chemical fire extinguishing agent may be ampered by a drawback . . . settling or packing can ccur after a lapse of time. However, with C-O-TWO)ry Chemical Type Fire Extinguishers there's no hance of this happening.

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which galvanized sheet has the zinc coat that doesn't flake?

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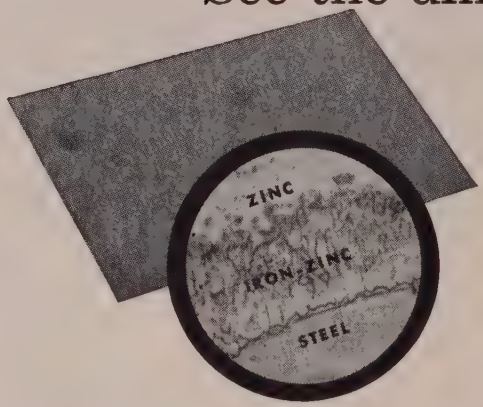

Cut Length Hot-Dipped

Thick, brittle iron-zinc alloy layer formed by chemical reaction in cut length hot-dipped process tends to crumble when sheet is formed, causing coating to crack, flake or peel.

Inland Ti-Co

Special Ti-Co continuous galvanizing process results in tight bond of zinc coat to steel, practically eliminating alloy layer. Coating actually stretches with the steel as it's formed, won't crack or peel.

(Cross sections of steel sheets enlarged 1,000 times by photomicrograph)

New Inland Ti-Co is the galvanized sheet you don't have to handle with kid gloves. It was developed especially to solve once and for all the problem of coating flaking you get using conventional cut length hot-dipped sheets.

Ti-Co's zinc coat takes any forming the steel will take. You can deep-draw it, stamp it, bend it, lock-seam it . . . and the coating stays put! You eliminate your biggest cause of rejects, save man-hours and machine time. And Ti-Co galvanized products look better, keep rust and corrosion sealed out *all over!*

Specify new Inland Ti-Co. Look for the Ti-Co stencil on all your galvanized sheets.

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Prefabricated Home Production

1954 (est.)	75,000 Homes
1953	55,000 Homes
1952	57,000 Homes
1951	50,000 Homes
1950	55,000 Homes
1949	35,000 Homes
1948	30,000 Homes

Source: Prefabricated Home Mfrs. Inst.

Prefabricated Houses: More Sales for Metalworking

"Packaged home" builders are finding more applications for metal products. The industry is aiming at a 40-per-cent share of the home market within 5 years

METALWORKING'S dollar volume esulting from private new housing onstruction will reach an all-time igh in 1954 even though estimated ew starts of 1.1 million this year vill be second to the record 1,352,-000 in 1950.

The reason is the growing pre-abricated market. Now building nly 7 per cent of total new hous-ng, prefab builders use more metal nd metalworking products than do onventional contractors in their rive for a greater share of the ingle-dwelling market. Prefabs lso benefit metalworking by cre-ting more mass buyers for plumb-ng, wiring, appliances and other quipment.

A New Look—That's why more nd more metalworking men are xamining the prefab industry for ew market possibilities—either in ll-metal or metal-and-wood hous-s. The industry shows signs of tarting to fulfill a decades-old ream whereby mass builders will merge much as has happened in he automotive field, to create im-nense markets. In housing the ream is far from being fully re-lized, but there are encouraging igns.

Estimated increases in 1954 of 0 to 40 per cent over last year re the rule among the members of this young prefab industry.

Record Ahead?—Prefabbers last year shipped about 55,000 units, their second best year (see table above). Their 2000-unit dip from 1952 was blamed on the mortgage money pinch of 1953; but with money now freer, the industry is predicting up to a 75,000-unit sales year for 1954.

To date the biggest metalworking markets are in the appliance and equipment lines—aluminum windows, storm windows and screens, stainless steel kitchens, heating and air-conditioning units. But in the industry's efforts to give "a better home at cheaper cost" more metalworking applications are being made.

An Example—Modern Homes Corp., Dearborn, Mich., for example, recently announced its Klear-Span floor system. This makes use of a series of truss-like steel bar joists. Savings over conventional wood construction amount to 22 to 24 per cent. President R. J. Lytle says his firm is now negotiating with suppliers to use similar construction for the roof.

Metal shipments to the prefab industry already amount to a sizable total (see table at right). Figures were taken from a survey made in 1950, a year in which the same number of homes were built as last year. The figures do not include plumbing fixtures, wiring, water heaters and the like.

Better Packages—With competition getting sharper, most prefab builders are looking toward more complete packages in prefab homes. In addition to including more refrigerators, stoves, air conditioning, kitchen cabinets with disposals, and automatic washers and driers, builders are planning complete wiring and plumbing units.

Biggest obstacle has been the union problem, but National Homes Corp., Lafayette, Ind., says it has worked out a plan with the plumbing union to include built-in plumbing on some units as an experiment. With prefabricated plumbing, officials estimate that the plumbing bill will be reduced from $700 to about $300. The nation's largest prefab producer, National Homes expects to build 24,000 homes this year compared to 12,200 last year.

Steel & Aluminum Used by Prefab Industry*

(for 1953 based upon 1950 figures)

Sheet Steel	8,950,000 pounds
Structural Steel	2,010,000 pounds
Aluminum Sheet	22,000 pounds
Aluminum Shapes	35,300 pounds

*Source: Prefabricated Home Mfrs. Inst.

A Bigger Slice—Sharpest metal-

working eye is being kept on U. S. Steel Homes Inc. for its new all-steel home. Even though the ill-fated Lustron experience is still vivid, the bets are high in favor of an all-metal home. John J. O'Brien, U. S. Steel Homes president, predicts that the factory-made homes within 5 years will increase from a current 7 per cent of the total single-family home market to 40 per cent.

More Basic Materials Do More Things

Old and new products and processes—plastics, alloys, and extrusions—share interest of product developers and designers at Basic Materials Show

DO new things with old materials and learn how to utilize effectively the new materials being developed. That is the advice given to product developers, design engineers and others attending the second Basic Materials Exposition and Conference at the International Amphitheatre in Chicago May 17-20.

Stainless steel honeycombs and sandwich materials under development by several companies attracted attention as a possible means of overcoming the problems of heat and stresses of supersonic flight.

Engineers also were attracted by the cost-cutting and better design possibilities of extruded parts from materials that once could be formed only by expensive machining methods.

Sandwich Barrel—As an example of combining new and old materials, one speaker cited the new type beer barrel with aluminum inner and outer shells. Space between the shells is filled with foam plastic. Result—cold beer for longer periods.

An exciting new material is thermenol, an alloy of 14 per cent aluminum, 80 per cent iron and 4 to 5 per cent molybdenum or vanadium, developed by Naval Ordnance. Engineers suggest cautiously that it may be used in many applications for which titanium is now being considered. It may replace stainless steel in some applications at a tremendous saving in weight. It is ductile, has good tensile strength, high electrical resistance and is corrosion resistant, engineers report.

Plastics Take More Heat—Plastic materials and combinations of plastics and glass are now being perfected for applications involving temperatures up to 700 degrees F. Heretofore, 500 degrees F has been considered the upper limit for plastics.

Attempts to make foamed aluminum are being discussed by the engineers. Such a development would permit higher temperature applications than are now attained through use of foamed plastics.

Small But Good—The exposition was small—68 exhibitors—as industrial shows go. The visitor traffic was also light in comparison with other shows but contained a high percentage of design engineers and others particularly interested in product development and design.

United Press

Commuter Conveyor

Moving sidewalk for commuters will soon be in operation in the Jersey City Erie Station of the Hudson & Manhattan tubes. Endless six-ply rubber belt 66 in. wide can carry about 9000 passengers daily up a 126-ft incline at a rate of 1½ mph; sidewalk also runs on the flat for another 100 ft. Cost: About $75,000

Look to Distribution

Sheet metal distributors' meeting stresses better methods for buyers' market

GROWING stature of distribution tools in industry was stressed at the 44th spring meeting of the National Association of Sheet Metal Distributors in Pittsburgh.

"Just as industry invests in production equipment, it must also invest in tools for distribution such as market research," says Robert M. Nelson, supervisor of distribution programs, Armco Steel Corp., Middletown, O. Reflecting increasing importance of distribution techniques in a buyers' market, Mr. Nelson stresses need for a carefully-planned selling program based on analysis of a company's products and its customers.

Suggestions Made — "Everyone in this group is interested in bettering his service," states NASMD President Lee J. Haines of E. E. Souther Iron Co., St. Louis. One of the suggestions: Speakers call on wholesalers and manufacturers to aid retailers in business management, sales promotion, selling and advertising.

Burton Longwell, assistant manager of sales, sheet and strip division, Republic Steel Corp., Cleveland, cites accomplishments of an NASMD committee on galvanized steel sheet development. This group has had a minimum standard coating weight of roofing sheets established.

Architectural Aluminum—H. F. Johnson, assistant manager of the architectural department, Aluminum Co. of America, Pittsburgh, says uses of aluminum in building have broadened considerably in the past five years. A growing number of aluminum alloys are being developed to fill the increasing demand.

Despite complaints that demand for sheet steel products is "dragging its heels," hotel corridor discussions are generally optimistic. Most members believe sales are leveling off and should increase in June. Wholesalers of galvanized sheet report brisk sales to building trades.

Sales Upswing — Optimistic re-

orts circulate of sales gains to air conditioning manufacturers. Consensus is that a good residential construction year would boost demand for sheet products in heating and cooling systems.

Atomic Power for Northwest

Five Pacific Northwest utility companies have undertaken the thirteenth nuclear power study authorized under Atomic Energy Commission's industrial participation program.

All costs of the study—to determine the feasibility of designing, constructing and operating an atomic power plant—will be borne by: Montana Power Co., Butte, Mont.; Washington Water Power Co., Spokane; Pacific Power & Light Co., Portland, Oreg.; Portland General Electric Co., Portland, Oreg.; and Mountain States Power Co., Albany, Oreg.

Navy Ship Due for Conversion

Bethlehem Pacific Coast Steel Corp. is low bidder on conversion of *Evergreen Mariner* into an attack cargo ship (AKA) for the Navy. The *Evergreen* presently is under construction at this company's yard in San Francisco. Three bids were submitted by Bethlehem. Its "hard bid" was $6,497,150, the work to be completed in 334 days to specifications to be prepared by Bethlehem. It submitted an alternate bid of $5,765,650 with an escalation clause. It also submitted a bid of $7,760,800 to be effective if the company has to work to specifications prepared by an outside firm or agency.

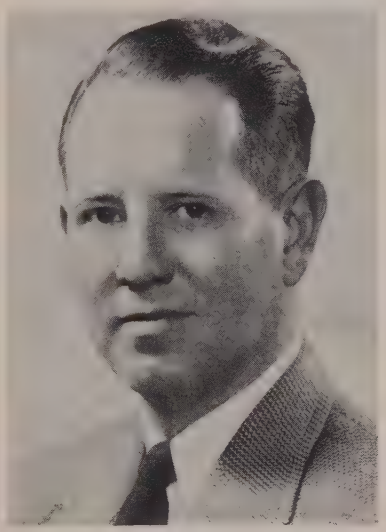
Bids on Scrapped Ships Opened

The apparent high bidder on eight sunken ships offered for scrapping by the Maritime Administration is T. Y. Fong, Tokyo, Japan, whose bid totaled $7000—on the basis of $1000 each for six and $500 each for two. The ships, including five tankers and three dry cargo, are off Cape Hatteras, Cape Henry, in the mouth of Chesapeake Bay and off Florida. Total deadweight is around 60,000 tons and the scrap content is estimated about 20,000 tons.

Supply Sales Regain Some Lost Ground

An uptrend that started last January is expected to bring 1954 industrial supply dollar sales to within 10 to 15 per cent of 1953's record-setting $4.3 billion

SALES of industrial supplies are off, but not too badly, and an uptrend that started last January is expected to continue through 1954 with perhaps a slight pause in July and August. That picture



T. D. VANDER VOORT
. . . new ASMMA president

would change radically if the U. S. decides to reactivate the preparedness program.

Such was the consensus of manufacturers and distributors meeting jointly in New York last week for their annual industrial supply convention.

Soft Spots in Prices—Sales last year were at a record $4.3 billion and so far in 1954 are down 10 to 15 per cent in dollars but only 5 to 10 per cent on a physical basis. That's because soft spots have been appearing here and there in prices, and the distributors say they also have persuaded most manufacturers to prepay transportation on shipments of more than 100 pounds. On the average prices are down 10 per cent, including the concessions made on transportation charges.

But prices now are beginning to strengthen in the growing belief that a new national emergency could quickly bring back government price controls.

Less Than Expected—T. D. Vander Voort, vice president and treasurer, Clemson Brothers Inc., Middletown, N. Y., and new president of the American Supply & Machinery Manufacturers Association, said that in his own company's case the decline in business so far in 1954 has been considerably less than had been anticipated late last year. He looks for a continued uptrend in 1954 interrupted only by the vacation slowdown.

The ASMMA new order index, based on 1947-49 equalling 100, touched a post-Korea low of 136.7 in December but bounced back to 141.5 in March and for May is estimated at 143. A year ago it stood at 171.1. Historically, this index anticipates swings in the Federal Reserve Board's industrial production index.

ASMMA, as usual, set aside one day for its Conference Booth Program. No products are shown, but the booths provide a convenient place for convention goers to discuss mutual problems.

Convention Co-op—Participating with ASMMA in the convention were the National Industrial Distributors Association and the Southern Industrial Distributors' Association. R. H. Barr, president, Reilly Brothers & Raub Inc., Lancaster, Pa., is the new president of the National Industrial Distributors Association; C. McD. England Jr., vice president and treasurer, Logan Hardware & Supply Co., Logan, W. Va., is the new president of the Southern Industrial Distributors' Association.

Other new officers of ASMMA include C. B. Noelting, Faultless Caster Corp., as first vice president and C. T. Jordan, Charles Parker Co., as second vice president.

After 24 years as ASMMA general manager, R. Kennedy Hanson has retired. Business affairs will be handled by Hunter-Thomas Associates, Cleveland.

CASE AGAINST THE Guaranteed Annual Wage...

By HERBERT E. MARKLEY
Secretary
The Timken Roller Bearing Co.

UNION demand for a so-called guaranteed annual wage is the biggest attention-getter in labor-management relations since the industrial pensions demand in 1949. The issue has far-reaching implications for the metalworking industry.

At STEEL's invitation, David J. McDonald, president of the United Steelworkers of America-CIO, outlined the case for the annual wage in the April 5 issue of this magazine.

Today, we present the viewpoints of metalworking management people on the issue.

—The Editors

ALTHOUGH the term "guaranteed annual wage" has a deep-rooted emotional appeal to the wage earner, current proposals by CIO unions really represent continued effort for bigger and better unemployment compensation, this time with a new twist. Specifically, the United Steelworkers of America-CIO are demanding that employers privately supplement the unemployment compensation benefits received from the state.

The program is being billed as a means to gain greater security for the workers. The quest for security is universal and is not peculiar to wage earners. Most of us try to acquire property, buy insurance, put money in the bank, invest in savings bonds and other securities to take care of us in our old age or to tide us over a rainy day.

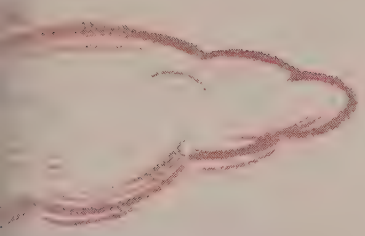
Road to Security—This method of providing for our security is based on the principle of denying ourselves present enjoyment for a greater need in the future. The savings of our people are invested and provide us with capital equipment to assure us of an ever-increasing standard of living.

For the past two decades, a different principle has been gaining acceptance—deny the other fellow. The United Steelworkers' proposal, masquerading as the guaranteed annual wage, employs the second of these principles.

No Magic Nostrum—We have no magic, nostrum or panacea to cure the economic ills of the steel industry. Careful consideration of the facts makes it clear that increasing unemployment benefits by private supplementation is not the solution to periodic large masses of unemployment that the union bosses would have us believe.

Our zealous search for security may lead us into a dead-end street causing us to lose that which we are seeking. The history of man has been a continuous struggle to achieve freedom of religion, of speech, from dependency upon a king, a lord, or a master employer.

Return to Serfdom—The current union demand for security becomes an ominous and dangerous issue in that it marks an almost complete return to the slave relationship which existed between the employer and employee in the days of ancient Greece and Rome. In the Middle Ages to break the chains of serfdom which held him under the feudal system, the employee began his struggle for freedom and



the privilege of providing his own security. The employer under the feudal system was completely responsible for the security and welfare of his employee. By the end of the Industrial Revolution, the individual working man had achieved a freedom unprecedented in the history of mankind.

Then the wage earner, encouraged and dominated by those who would control his destiny, gradually gave up his personal and individual bargaining rights and substituted collective effort to achieve more and more security, but at each step he lost more and more of his freedom. The supplemental unemployment compensation proposal marks the road back to complete dependency by the employee for his security and welfare upon economic institutions. His struggle to become free in

GAW: Return to serfdom?

order that he might control and strengthen his economic position and his security has led him to the very thing he has tried to escape.

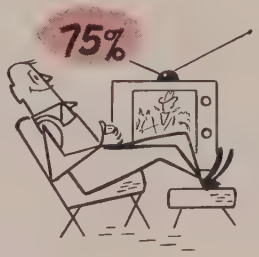
Charged to Employer — The United Steelworkers of America-CIO has stressed that unemployment compensation benefits which the employee receives from the state are a deduction from the obligations which the employer would assume under its proposal of private supplementation. Benefits now paid by the state to unemployed workers are charged directly to their former employer.

Because the employer pays the benefits, whether paid through the state or directly by him, we should examine the consequences of supplementing state benefits. In all states there is a maximum percentage of payroll that employers must contribute to the state fund. In many states those employers able to establish stable employment are permitted to pay a lower rate once certain reserves have been accumulated. This is known as experience rating, a practice long opposed by the same labor unions who now argue that an obligation to supplement unemployment compensation is an incentive for employers to stabilize their employment.

Discourage Job Seeking—A supplemental private payment which with the benefits received from the state would provide an employee 75 per cent of his standard pay, or even 100 per cent advocated by some unions, would almost certainly discourage his seeking other employment. The drain on the state unemployment compensation fund would increase tremendously. Under all state laws it is provided that when an employer's contributions at the maximum tax rates are not sufficient to meet the benefit costs attributable to his operations, then all other employers are required to pay these above maximum costs. Where one employer wishes to grant a fringe benefit such as pensions, for example, and is willing and can afford to assume the cost, that is one thing. When, on the other hand, he incurs an obligation to privately supplement unemployment compensation, the implications of which reach beyond the confines of his own company, it is not honest or decent because he thereby transfers some of his costs to other employers.

More Than Fringe Benefit — Many employers have regarded the union demands as another fringe benefit. No thinking could be more dangerous because the guaranteed annual wage demand is more than a fringe benefit and its consequences are economically far more serious. In fact, experts in the field of unemployment compensation believe this program will destroy the entire system now operating in all of our states.

Proponents of the guaranteed annual wage have claimed that it will provide full employment and stabilize prosperity — in other



Why work if jobless pay is high?

words, prevent depressions. A prominent labor leader has said time and time again that jobs make payrolls, payrolls make purchasing power, purchasing power makes jobs and thus we have continued prosperity. While this theme has popular appeal and the unions have used it effectively to gain the support of the public and of their membership, it is by no means the whole truth. Economists of any note agree that purchasing power does not necessarily equal the effective demand at any given point in the business cycle. The shortest and perhaps the most devastating answer to the idea that supplemental payments to unemployment compensation will maintain prosperity is that almost by definition downturns in the business cycle come when purchasing power is at its peak, up-turns come when purchasing power is at its lowest.

Pump Priming Ineffective—If maintenance of purchasing power has any validity, it should have worked with government pump priming and deficit financing in the 1930s. Between 1932 and 1939, federal expenditures rose from 4.5 billion to 9 billion dollars annually. We increased our annual deficit from 2.9 billion to 3.7 billion dollars. In spite of these government maneuvers, personal consumption expenditures rose only from 61.2 billion to 64.5 billion dollars on an

Breaking the Camel's Back

ECONOMIC security for the individual cannot be achieved at the collective bargaining table.

While the endeavor of union leaders to preserve continuity of employment for their members is natural and praiseworthy, it is questionable whether corporations can stand the added financial burden. Especially is this true when recently installed pension plans are not yet adequately funded.

To add a new financial burden in the form of a guaranteed annual wage on top of the obligations for pensions and insurance might be the straw that broke the camel's back. An insolvent corporation is a mighty poor vehicle through which to guarantee pensions, annual wages, or even wages of any kind.

Joseph L. Block
President
Inland Steel Co.

annual basis. In 1932, we had 12 million unemployed. At the end of the grand experiment in 1939, there were still between 9.5 and 10 million unemployed. If the idea that pumping purchasing power into the hands of consumers will either prevent or cure recession has any merit, this experiment on such an enormous scale should have shown significant results.

Further analysis reveals that a substantial portion of the goods we buy are luxuries. We spend an even greater part of our income on durable goods, replacement of which can be postponed for indefinite periods. Many of these durable goods are for the expansion of business facilities and for the raising of living standards. Neither business men nor consumers are going to spend money when chey have pessimistic expectations for the future. These pessimistic expectations are among the most significant obstacles preventing purchasing power from being translated into effective demand.

Many Not Covered—In addition, a very large number of persons receiving income would not be beneficiaries in any case. It is estimated that one fourth of the total working force is self-employed. Another large group such as construction workers, entertainers, and others work intermittently and for them a wage guarantee would be impractical. An even larger group for whom the guaranteed annual wage is totally impractical is made up of long-service employees who ordinarily are not laid off even in severe depressions, particularly when they work in industries that are inherently stable.

Millions of employees would fall within the group indicated by George L. Meany, president, American Federation of Labor, when he stated, "We know without question that it's almost an impossibility under our economic system to have a guaranteed annual wage in certain types of business."

Impractical in Steel—The steel industry particularly has experienced drastic economic fluctuations, making the guaranteed annual wage impractical, if not impossible. During times of national emergency, employment has skyrocketed. During times of recession, steel production is seriously curtailed and sales are drastically reduced. Undoubtedly Mr. Meany was thinking about the steel industry when he made this statement.

Sumner Slichter of Harvard estimates that at best only one-sixth of all consumer incomes would be directly augmented by the guaranteed annual wage. Keeping in mind that only about two-thirds of the gross national income is in the form of wages and salaries, a little arithmetic brings us to the conclusion that no more than 10 per cent of this total national income would ever be directly affected by the guaranteed annual wage. Obviously, this is not a sufficient part of our national income to prevent a depression or conversely, to create one.

People Not Statistics—It has been argued that the attitude of people and not statistics determines whether or not we will have prosperity. Workers are induced to spend their present income when they know some form of benefits for unemployment will be paid. Still, it seems likely that if income beyond the benefit period is not assured, a worker would not buy a house or a car or a refrigerator. Purchases of durable goods are always curtailed when the take-home pay of wage earners is reduced—for instance when overtime pay is eliminated. We may expect this curtailment to become even more drastic if employees have doubts about the future. Yet it is the high demand for durable goods that must be sustained to maintain prosperity. The guaranteed annual wage is highly unlikely to significantly influence the buying of these important commodities.

May Discourage Hirings—Will supplemental unemployment compensation provide full employment? It could actually increase unemployment. An employer knowing that to hire a new employee makes

History of pump-priming: Failure

him liable for 75 per cent or more of one year's pay for which he will receive no services from the worker will be very reluctant to add to his work force. This obligation to provide supplementary benefits must be a charge against his cost of production. If increased costs of production must come from the limited profits in the steel industry (5.6 per cent in

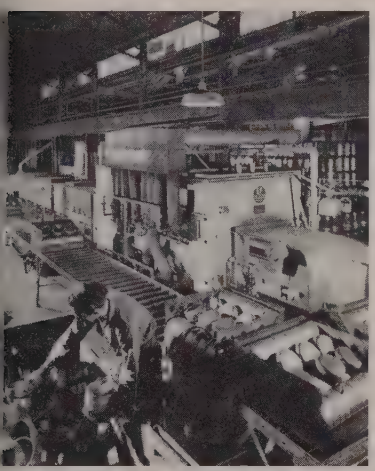
(*Please turn to page* 90)

Outlook for Furnaces

Makers of the industrial units look to modernization, automation to fire lagging sales

INDUSTRIAL furnacemakers are ring up new sales programs ased on a modernization theme o loosen a tightening market.

First-quarter net sales this year re down 32 per cent from 1953's 68 million, according to figures re-



Worcester Pressed Steel

SALES WARMING UP
. . . 1954 to be good furnace year

ported at the Industrial Furnace Manufacturers Association meeting last week in Hot Springs, Va. Members report gas furnace sales down 50 per cent, but electric furnaces showed an increase in the first-quarter period.

Technology Gain — Industrial heating technology has come up faster in the past few years than most users realize, furnacemakers say. To boost sales, they're counting on getting industry to replace old, obsolete equipment with new furnaces having labor-saving and quality features.

Some furnace builders, however, are experiencing an increase over last year's sales. W. H. Holcroft, executive vice president of Holcroft & Co., Detroit, told STEEL: "Our business is running considerably ahead of last year due to expansion and modernization of auto companies. Also, there is an indication that the agricultural line is picking up." He added that automation is the dominating factor in new installations.

Outlook — Although the first quarter of this year saw some cancellations of contracts made in 1953, Carl L. Ipsen, IFMA executive vice president, predicts that second-quarter business will be better and that 1954 will add up to a pretty good year for furnace builders.

Steel Employment Dips

Steel industry employment for March was estimated at 620,500, a decline from February's 636,100, reports American Iron & Steel Institute.

Average hourly payroll costs of $2.278 also were under February's $2.299 but were substantally above the $2.206 of a year ago. Adding the cost of pensions, social security and insurance on the basis of the 1953 average, the March, 1954, cost would go up to $2.451.

Reflecting a greater number of working days, estimated total payroll for March was $249,672,000, compared to February's $236,574,000.

Total payroll for first quarter, 1954, was about $738 million; estimated employment for the quarter was 633,800.

Petroleum Expansion Continues

Fast tax amortization certificates granted by the Office of Defense Mobilization point to continued good sales prospects for pipe producers and other metalworkers supplying the petroleum industry.

Among the 69 certificates for new or expanded facilities granted by ODM from Apr. 22 to May 5 were:

Texas Co., Port Arthur, Tex., a $7.2-million certificate, 65 per cent amortization allowed, and a $4.1-million certificate with 45 per cent allowed for refining facilities; Oil Basin Pipe Line Co., $5.2-million certificate for a pipeline from Laurel to Glendive, Mont., 25 per cent allowed; Aurora Gasoline Co., Detroit, three certificates for petroleum refining—$4.2 million at 65 per cent, $755,000 at 45 per cent, and $315,000 at 15 per cent; Sun Oil Co., Marcus Hook, Pa., certificate for $4.4 million for refining facilities, 65 per cent allowed.

Ford Tailors Plant Tour to Visitors' Interests

VISITORS making plant tours are a lot like students in school: Some go fast, others go slowly, and nearly every one has a different area of particular interest.

Executives at Ford Motor Co.'s Cleveland foundry recognized these facts when setting up a large plant tour for American Foundrymen's Society members two weeks ago.

Their Own Pace—Instead of organizing visitors into groups of 12 or 15 persons with a plant guide, Ford marked out the tour route, started the vistors in the right direction, allowed each person to set off at his own pace. Guides were stationed at intervals along the route to answer questions. Heads of departments also were primed for this duty.

How did it work? People went through the plant faster on their own than when on guided tours. Fewer guides were needed to handle the 900-plus visitors. Persons making the tour almost without exception felt they got more out of it because they had more time to spend in areas of their own special interest.

Tailored Tours—"We feel this type of tour gives our visitors a better look at the plant because it's tailored to suit the visitors' interests," says Omer LaVergne, Ford personnel representative in manufacturing.

Remember when setting up a tailored tour:

1. With groups of less than 200 people, guided tours still are probably best.
2. Guides, heads of departments, and foremen should be alerted to dangerous areas in the plant and told to keep tourists out of them.
3. Route of tour, guides and heads of departments should be clearly identified so that tourists won't stray or interrupt production employees with questions.
4. Have a definite deadline for the end of the touring period.

Administration Sharpens Antidepression Weapons

NOW THAT indications of a business upturn are multiplying, the government is talking more freely of what it would do in case of a serious depression.

There's sense, of a sort, in that paradox. A few months—even a few weeks—ago Washington planners were markedly reluctant to go into details about depression remedies on the theory that such talk would spur psychological setbacks. Indicative of their growing optimism about business is the fact that they're now talking more about antidepression weapons.

The administration does have a program. Some of it already has been employed with stimulating effect.

Monetary Policy

A year ago the Treasury department and the Federal Reserve Board collaborated to bring about an "easy money" supply. FRB reduced banks' reserve requirements to the extent of releasing $1.2-billion of "high-powered" money —so-called because $6 may be loaned for every $1 of reserve. The FRB began purchasing 90-day Treasury bills and other government securities from the banks to give the latter more loanable funds. At the same time the Treasury reduced the interest rate on its bills.

What happened? States and municipalities issued securities to finance new public works programs. Banks reduced their prime lending rates to borrowers. Finance companies (like General Motors Acceptance Corp.) reduced down payments on borrowers' notes and lengthened periods of maturity. This easy money policy is given much credit for the underlying strength of business in the face of reduced government expenditures.

Tax Reductions

Already substantial relief has been provided to individual taxpayers who now will have more money to spend for their own needs. Further tax cuts are possible should public purchasing power need another shot in the arm. While the 52-per-cent income tax on corporations is scheduled to be retained, industry is expected to benefit from the incentive features of the new tax bill. Should a push in buying of industrial capital equipment be needed, the 52-per-cent corporate rate could be reduced.

Hardship Loans

While banks will be encouraged to take care of loan needs to maximum extent, there are many cases where the banks cannot advance funds. The government already is taking care of such hardship cases. Only two-thirds of the Small Business Administration loans to date have been in participation with banks; the remaining one-third have been government loans without such participation. SBA has broad powers, such as granting disaster loans and booking prime government contracts and subletting them to companies in distressed areas.

Public Works

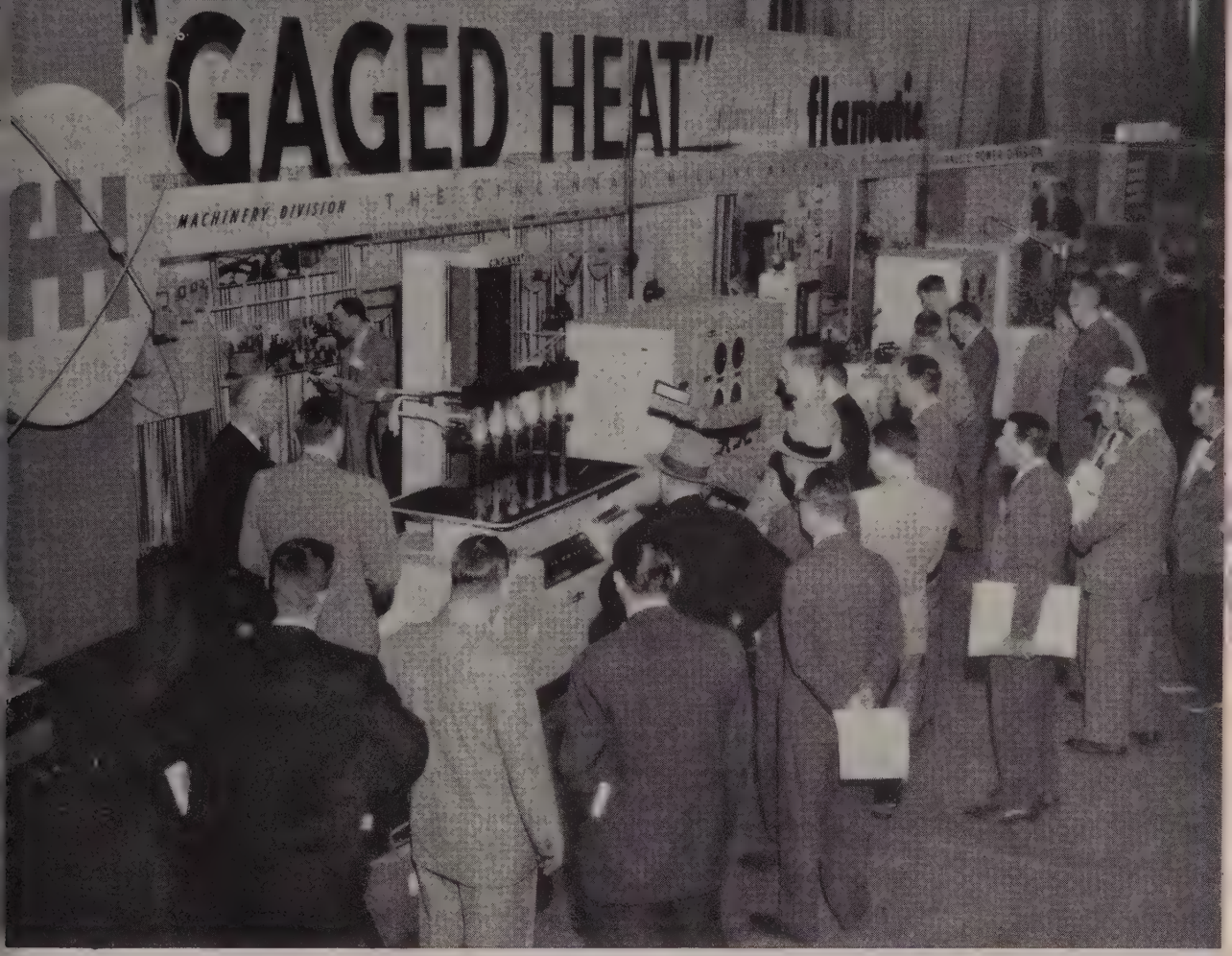
Federal incentives would be provided to step up public works of the states and municipalities. In addition, the federal government would come through with new public works. This program would be launched progressively in accordance with the need.

Aid to Unemployed

Two steps have been taken in regard to unemployment compensation. Congress has been asked to increase coverage of the unemployment compensation system from the present 36.5 million to 43 million people, and the Ways & Means Committee will start hearings on this proposal with a view to legislation at this session. The states have been asked to step up payments so that idle workers will get compensation equal to half their earnings rate and to stretch payments over 26 weeks. Some states have acted and others are at work.

Aid to Farmers

The Agriculture department has powers and funds for making crop loans and meeting emergencies, such as the drought relief program of last year. It also has powers to move surplus farm products to needy people. Huge sums of cash could be siphoned to farmers through a conservation program which has been blueprinted; all that is necessary is an appropriation by Congress.



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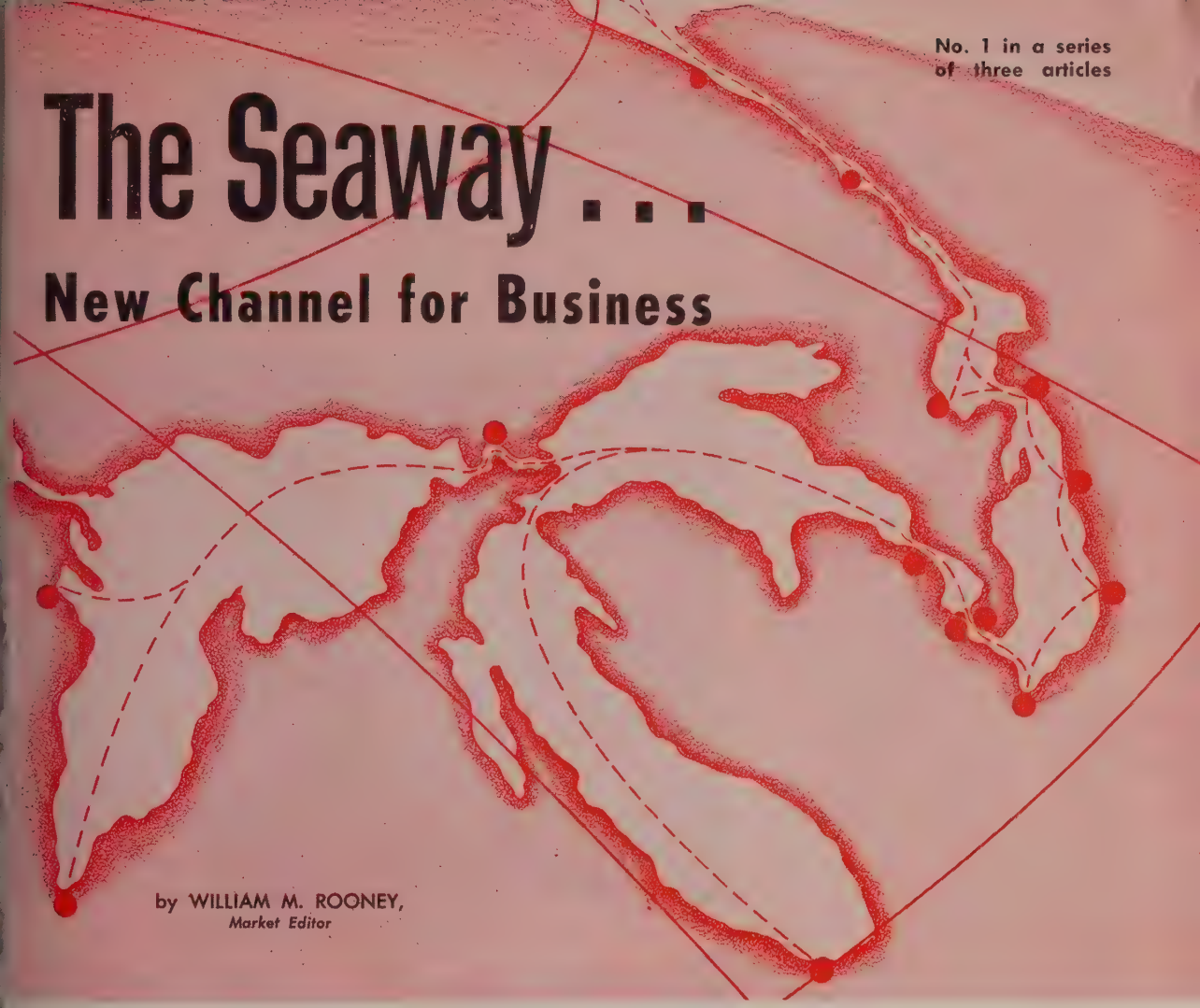
No. 1 in a series of three articles

The Seaway . . .

New Channel for Business



by WILLIAM M. ROONEY,
Market Editor

ACQUES CARTIER and Samuel e Champlain, if alive today, would rely look with approval on the 3rd American Congress. Those in- epid French explorers, of a cer- inty, would enthusiastically ap- aud the seaway-enabling legisla- on assuring development beyond eir wildest dreams of the St. awrence river which they opened western civilization some 400 ears or so ago.

Much water has flowed down the t. Lawrence from the lakes to the a since joint United States-Can- da construction of a seaway to ermit passage of ocean-going ves- ls to the inland lakes was first eriously considered. For more an 30 years the project, approved y every President from Wilson to Eisenhower, has been stymied by what seemed endless debate and the frustrating delaying tactics of opponents.

The Last Round — But that is past. The House of Representatives, for all practical purposes, by vote of 241 to 158 early this month, wrote "finis" to the years-long hassle. The Senate had approved American participation last January, while authorization has been a matter of Canadian law since 1951.

Prompt Senate approval of two minor changes in the law as passed by the House and President Eisenhower's signing of the bill leave only a few roadblocks to be hurdled in getting the long-debated project under way. Most of these are relatively minor. The most important concerns power development which is integral to the seaway project as a whole.

Green Light Awaited—Now before the Supreme Court is the question raised by coal and railroad interests as to the validity of New York state's participation with Ontario, Canada, in the hydropower development at the Long Sault rapids. This participation, sanctioned by the Federal Power Commission and the International Joint Commission, was affirmed by the U. S. Court of Appeals last January. Favorable opinion by the Supreme Court, expected in June, will give the green light to the project.

Canada's determination to build

the seaway alone if necessary was an important factor in winning Congress' approval for joint participation of this country in the project. The over-riding consideration influencing the change in congressional sentiment toward the seaway, however, stemmed from conversion of hitherto powerful opponents of the proposal to proponents over the past several years, with the project's defense potential in the present explosive international situation providing the clincher for the long drawn-out argument.

The Spur—Canadian authorities have made it clear right along they intended to go it alone if American participation, which was welcomed, was not forthcoming, and soon. This position, backed by the Canadian legislation of December, 1951, authorizing construction and providing $300 million of government guaranteed financing to do the job, has been affirmed time and again by responsible Canadian government spokesmen.

The Dominion's capability, both in law and resources, to complete the project on her own has been unquestioned here. This point has been emphasized over and over again as the debate in Congress waxed to a climax.

Big Job Ahead—Although firmly committed to the project, however, it appears the Canadian authorities still have a great deal of planning to do before they can move actively into the work, though it has been reported they would be ready to make a start on the project this fall. At any rate, this is indicated by the recent criticism of Ontario officials for alleged unpreparedness with respect to the relocation of cities and towns of the province that will be affected by the seaway and power project.

Criticism for official inertia has been leveled at the provincial government and its responsible cabinet ministers, the Ontario Hydro-Electric Power Commission and the Ontario Department of Planning & Development since passage of the seaway legislation by the U. S. Congress. It probably will spark early action now that American participation is assured.

To Start in 1954—Obviously a great many details must be worked out before a start on the project can be made. Nevertheless, work is expected to get under way late this year with completion of the initial installations predicted as likely by 1960 or so.

Considering the vastness of the project and the fact planning now is scarcely more than in the embryo stage, this timing may be optimistic, especially in view of the possibility of plan revision and expansion as the full potential of the undertaking unfolds. Certainly, realization of the fullest benefits of the over-all proposal as now charted is clearly much further away than six or seven years.

Opens New Vistas—Implications for commerce and trade are obvious, especially for the area contiguous to the Great Lakes. A great deal of the support, financial and otherwise, for the seaway and power development has come from that region. Midwestern farm, ore and steel interests, manufacturers and municipalities have energetically promoted the project almost from the beginning, but especially the past decade or so during which time the area's steelmakers, faced with shrinking high-grade ore reserves at the head of the lakes, directed their attention to tapping the huge Labrador deposits.

Because of the obvious benefits and advantages to the Great Lakes region through extension of the nation's seacoast hundreds of miles to mid-America, the seaway proposal in Congress was referred to by its opponents as special interest legislation for the benefit of midwestern steel companies and municipalities which stand to benefit at the expense of other states.

Rebuttal—To which proponents reply that the Great Lakes and their connecting waterways are the most important unit of inland water transportation in the world and savings in cost of transportation resulting from governmental improvement of facilities will benefit, either directly or indirectly, the whole population of the country.

The seaway has been vigorously opposed by the railroads, which fear loss of business to the waterway; by the coal producers and miners, who anticipate competition from European fuel and loss of tonnage business as a result of the hydro-power development; by private power companies, which expect increased competition from cheap public power over a wide area and from ports on the Atlantic and Gulf coasts, which see in the opening of the Great Lakes to great ocean traffic than at present a diversion from them of a large volume of foreign trade, both incoming and outgoing.

NEA

Cities like Chicago will become deep-water ports . . .

Tide Turns—Until this year opponents of the seaway have always been able to win majority support in Congress for their position or at least prevent a showdown vote on the proposal. The proposal in one form or another has been defeated several times in the Senate, but the House had never voted on it until this year. The first Senate setback came in 1934 when the United States, seeking to settle the matter by treaty, failed to obtain ratification by a 46 to 42 vote. A bill was reported again in 1946 seeking to implement an agreement signed in 1941. The Senate failed to act on this. Bills were recommitted in 1948 by a vote of 57 to 30, and again in 1951 by a vote of 43 to 40.

Sentiment began swinging to the seaway several years back when Midwest ore and steel interests switched from the opposition camp and joined proponents, their change of allegiance being sparked by the development of Labrador's huge iron ore deposits. Over the past year congressional opposition has steadily melted away for one reason or another, notably the stand of President Eisenhower and the National Security Council that the seaway was vital to national security.

Just a Start—Actually the law just passed by Congress covers only a third of the project which consists of three separate parts in its entirety.

First there is the power project at the International Rapids section of the St. Lawrence. It is proposed to develop 2,200,000 horsepower of electrical energy.

Then there is the 27-foot-deep seaway from Montreal to Lake Ontario on the St. Lawrence river which will replace the present all-Canadian 14-foot passage around the International Rapids section of the river.

Finally, there is the problem of deepening the connecting channels between Lake Erie, Lake Huron and Lake Superior, where the controlling depth of present channels is 21 feet upbound and 25 feet downbound.

Sets Up Corporation — The law just passed by Congress provides for creation of a St. Lawrence Seaway Development Corp. to conduct negotiations with Canada for the building and maintaining of the seaway. This corporation is empowered to make arrangements with Canada relative to construction and operation of the passage and to finance the American share of the costs on a self-liquidating basis.

In addition to establishing general principles for joint Canadian-American control of the project, the law also provides for negotiating an agreement with Canada on tolls and division of revenue.

Construction authorized in the bill is largely confined to the International Rapids section of the river over a total of possibly 11 miles.

Multimillion Project — Dredging of the channels in the Thousand Islands section is required, and the total cost of the designated work to the United States, including cost of financing which is to be covered by toll charges paid by users of the seaway, is estimated at $105-million. Canada is expected to spend more than $200 million in the construction of her part of the project.

Power development is not included in the legislation just passed by Congress. About a year ago the Federal Power Commission licensed the Power Authority of the State of New York to build the share of the power installations on the American side of the river.

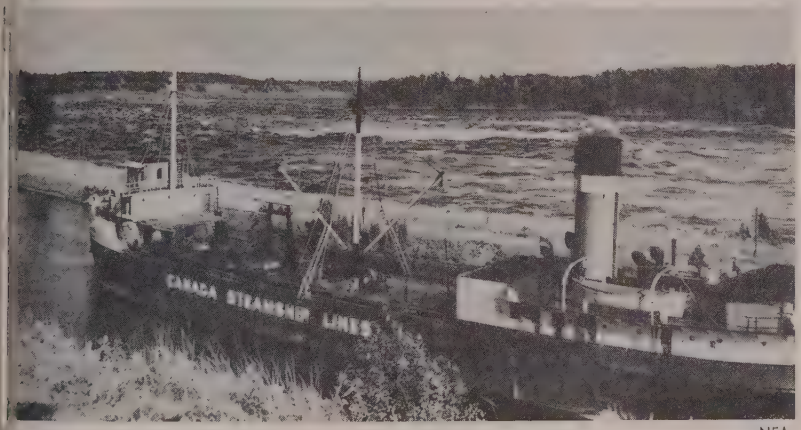
In Court—This licensing, upheld by the U. S. Court of Appeals, awaits favorable ruling of the U. S. Supreme Court. Meanwhile, New York state and Ontario authorities are going ahead with engineering planning with a view to starting construction as soon as possible. It is estimated the power development project will cost in excess of $600 million.

Necessary deepening of Great Lakes connecting channels and harbors, imperative if fullest benefits of the seaway are to be achieved, also is not included in the present legislation. Provision for these improvements will come later when increased traffic warrants additional expenditures. Last year the House Committee on Public Works authorized a survey by the Corps of Engineers to determine the economic feasibility of deepening the connecting channels.

Months of Planning—With the legislative hurdle out of the way hectic months of planning are ahead if fullest advantage is to be taken of the potential trade and commerce the seaway will make possible along the Great Lakes. The seaway as authorized by Congress is only a starter on a project that ultimately will involve hundreds of million of dollars.

Aspects of the physical facilities involved in attaining fullest values from the seaway are literally stupendous.

Watch for part two in next week's issue.



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Automen Stick with Adhesives, Develop Production Techniques

DETROIT

ADHESIVES somehow connote a makeshift or temporary method of sticking things together incongruous with metalworking manufacture. But adhesives are being developed today which will bond steel to steel with a shear strength of 1800 psi, a tension resistance of 1400-1600 psi and an impact resistance of 14-17 foot-pounds at room temperature.

That's one reason why industry's use of adhesives has more than doubled since the end of World War II, and the uses are growing steadily.

For Aircraft — Biggest user of adhesives among metalworkers is probably the aircraft industry where elimination of a pound figures out to about $300 payload saving in the life of an airplane. Here adhesives are being used to fasten floor sections and bulkheads in place, even to bond the metal skin to inboard wing sections and tail surfaces in some cases. And British aircraft manufacturers are reported using adhesives alone in some wing covering jobs, eliminating holes and rivets. Hardwood tip protectors on metal helicopter blades are also being bonded with adhesives under vacuum bag pressure.

No slouch at picking up adhesives is the auto industry. Stimulating this increase in research and development are major changes in body design, introduction of improved heating and ventilating systems, and adoption of pastel interior trim colors, says Cord Lipe, sales manager of Chrysler Corp.'s Cycleweld Div. The impact of these factors is twofold: Automobiles are becoming harder to seal effectively, and the need for an effective seal to retain heat and eliminate dirt is more crucial.

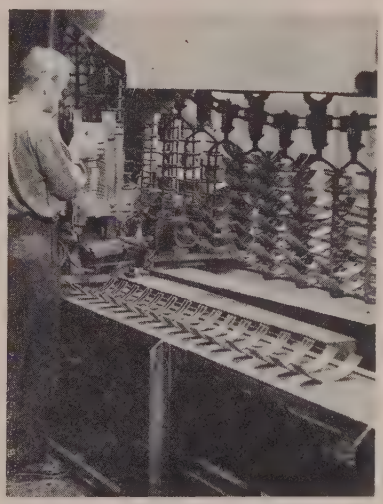
Bonding Is Basic—Basic to the solution of better sealing is the old problem of bonding rubber to metal. Not only is the basic flexibility of rubber antithetical to good adhesion, but extruder lubricants, mold release compounds and plasticizers in the rubbers continue to inhibit the adhesion. Add to this extravagant automobile body contours which change weatherstrip design and action, and you have a neat little problem.

The principle development work on this class of adhesives is the attempt to work out such problems as quick and aggressive tack, very good adhesion, possible sprayability or other fast application techniques. As a result of studies of these difficulties, good adhesion to metal—either bare, primed or finish coated—is being secured.

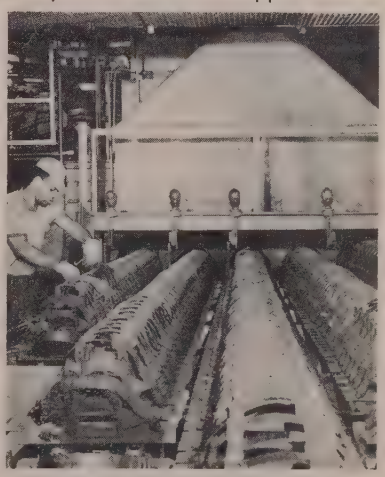
Progress—Sealers of the solvent cut-back type are also coming in for a new look. Shrinking, blistering, pinholing, wicking and staining are characteristics being overcome through a move to 100-percent heat convertible compounds. These may be in liquid or extruded form and may be compounded to expand and fill the crack upon exposure to paint oven heat. A new solution to spot-weld joint sealing, formerly troublesome because of "blowing" at the spots, may come through a limited flow sealer which effects a seal when exposed to the heat of the paint oven.

Headache of leakers is still fixed glass in spite of unitized windshield construction. Heretofore the self-sealing type of weatherstrip has dominated the thinking in the problem of sealing fixed glass. This type of strip has not eliminated the problem of gap sealing around sharp

At Chrysler's Lynch road plant . . .
Brake linings are wirebrushed



Cycleweld adhesive applied



Adhesive heat-cured in furnace

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curves in windshield glass. Headlining and trim fabric is often tucked into or behind these weatherstrips and is in direct contact with the sealer.

Development work on this problem is in the direction of flow-gun grade materials of high solids for effective closing of gaps—nonflowable, nonstaining and nonwicking. A permanently flexible, soft, easy-clean-up sealer is the object.

Success—Perhaps the most spectacular success of adhesives in the auto industry has been in the field of friction material bonding, such as brake linings to shoes, transmission segments to bands and clutch sections to facing plates. The biggest single use of adhesives in the industry, this trend is moving ahead rapidly with such suppliers of replacement linings as Johns-Manville and Raybestos now offering linings precoated with adhesive for field installation. With such linings, the repairman merely faces the drum and shoe, puts the new lining and shoe into a pressure fixture, and applies heat to effect the bond.

At the factory where cars are built the savings are even more striking. Eliminated are the former holes and rivets with production running up to 80,000 brake shoes a day at the Chrysler Lynch Road Plant. All transmission bands today are bonded to the friction material not only because space for rivets is at a premium in such units, but because a sheared rivet could do extreme damage in these delicate mechanisms. Chrysler supplies cement for this purpose to such companies as Buick, Ford and Chevrolet.

Machine Tools Too—Machine tools also use bonded brakes and clutches today. Another use of adhesives in machine tools cited by Mr. Lipe is in the ways of large milling machines, lathes, etc. They are now being surfaced with a layer of end-grain formica phenolic laminate. This way surface is adhered with epoxy resin. By controlling the thickness of the adhesive these previously finished way surfaces can be kept flat.

Other industrial uses include adhesives to fasten fractional horsepower motor laminations with an increase in electrical capacity and fastening sound and heat insulating materials to metal appliances.

What's Ahead?—For the future in industry, adhesives look like a good bet to bond cans containing such nonedible products as motor oil. Produced at a rate of about 600 per minute, these cans require a considerable amount of solder containing costly tin and lead. Although the production rate is a problem because resins that will set in 1/10 second are hard to come by, techniques to apply the adhesive under pressure or before the station where the seam is joined promise an early solution to the problem. Later, when the solution to toxic aspects of the adhesives has been explored, adhesives will probably also be bonding food containers.

Against Noise, Heat—A probable early automotive development will be sheets of material to insulate bodies against noise and heat. Adhering to the inner panel of a door, for example, the material would swell up and become cellular like a loaf of bread when placed in the paint-drying oven. Use of adhesive material to attach diaphragms to fuel pumps, fasten

Auto, Truck Output

U. S. and Canada

	1954	1953
January	594,789	614,000
February	573,801	628,017
March	672,485	752,149
April	676,231	782,491
May		685,390
June		713,206
July		757,595
August		641,152
September		605,228
October		651,153
November		457,852
December		529,588
Total		7,817,821

Week Ended	1954	1953
Apr. 17	148,559	162,171
Apr. 24	157,710	194,610
May 1	159,206	184,800
May 8	154,640	179,621
May 15	151,797	177,305
May 22	153,000*	177,805

Source: Ward's Automotive Reports.
*Estimated by STEEL.

plastic dashboards to metal bodie and even assemble such parts a doors and deck lids is probabl

But the use of adhesives to a semble your entire car body relatively remote, says Mr. Lip unless plastics should come int the picture. Advantages of com plete body sealing would be mor than offset by disadvantages i retooling and body manufactur recycling. But with plastic bodie or plastic parts of metal bodie where adhesives act to adjust th coefficient of expansion, their us would be a different story.

Headache of Heat—Then, in th long pull, there's the bugbear o adhesives that appears hardest t overcome—heat. While some ad hesives won't fail up to the bluin point of steel at about 700 degree F, that still shuts the door t what otherwise might become al most universal application. Thu while adhesives can be used t fasten cutting edges to woodwork ing tools, their use in bondin carbide tips, for example, is pro hibited by the greater heat o metalworking applications.

Mr. Lipe sees a great future fo adhesives in many jobs now bein done by fasteners and by welc ing. But he points out that metal working men anxious to use ad hesives in their product must no handle adhesives lightly. Al though adhesives can do a grea deal, there is a danger that th factors in the cycle—time, tem perature and pressure—will no be controlled carefully, and tha adhesives will be used for pur poses to which they are unsuited

Dangers—That's a natural ten dency when you come up agains an adhesive like Cycleweld's C-1 which will bond metal, wood phenolic laminates, glass and rub ber to each other or in any com bination. But the development o adhesives and their effective ap plication are as exacting as the field is growing. Judgment must be exercised lest their misapplica tion result in public prejudice similar to that accorded plastics some years ago.

Adhesives are on their way While the day of the automobile "stuck together" does not appear likely, the impact of adhesives on the automakers and upon industry generally promises to be great

DIE CAST OF ZINC

for LIONEL

Here's Why .....

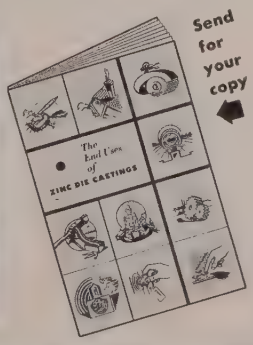
Drawing on the engineering know-how accumulated in the long-time manufacture of model electric train equipment, the Lionel Corporation has been highly selective in the materials and processes for the production of the new LINEX Stereo Camera*. It is of particular significance, therefore, that ZINC Die Castings are used for the complete camera case and front cover plate (above) as well as for the four operating components shown below.

*The LINEX is a brand new product just introduced in New York City by the Linex Corporation—a Division of the Lionel Corporation. It takes full color 3-dimensional pictures and is sold, complete with shoulder strap, carrying case, viewer and film for $44.50. It should soon be available throughout the country.

Low Cost—Die casting is the only method by which these parts could be produced at reasonable cost and ZINC provides the utmost in castability. The complexity of shape thus achieved not only permits an unusually compact assembly but greatly minimizes the need for costly machining and assembling operations.

Top Quality—Obviously a high degree of dimensional accuracy is required for this type of application and ZINC rates highest among the commonly used die casting alloys in this respect. ZINC Die Castings also assure *toughness* to withstand abuse and they provide sufficient weight to give the camera a "feel of quality." The as-cast surfaces of the large castings are easily finished in an attractive wrinkle-enamel and the small parts are electroplated.

Ask us—or any die casting company—for a copy of "The End Uses of Zinc Die Castings" to learn about the diversity of ZINC Die Casting applications.



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The New Jersey Zinc Company
160 Front St., New York 38, N.Y.

ZINC
FOR DIE CASTING ALLOYS

The Research was done, the Alloys were developed, and most Die Castings are based on

HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC

How we opened the door to lower costs for Ford

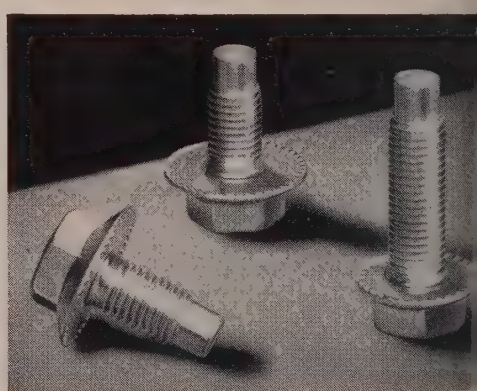
Two hinges on every Ford door. Six screws and 12 washers for each hinge.

Did this present an opportunity for cost reduction? An RB&W "fastener engineer" thought so. And after careful analysis and time studies Ford engineers agreed.

The solution: RB&W Hex SPIN-LOCK screws to fasten the hinge to the door, eliminating the need for washers. And special wide-flange Hex SPIN-LOCK screws for attaching the hinge to the frame, doing away with more washers. The wide flange is necessary to cover an elongated hole in which the hinge moves to permit accurate alignment.

Result — parts requirements are cut by two thirds, assembly is simplified, purchasing and inventory costs are lowered. And RB&W SPIN-LOCK screws hold those door hinges tight for good.

We will be glad to send an RB&W man around to check up on your fastening operations. Every problem is different, of course, but RB&W has a fastener for just about every job. If you need a "special", as Ford did, we'll design and make it for you. Write RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY, Port Chester, New York.

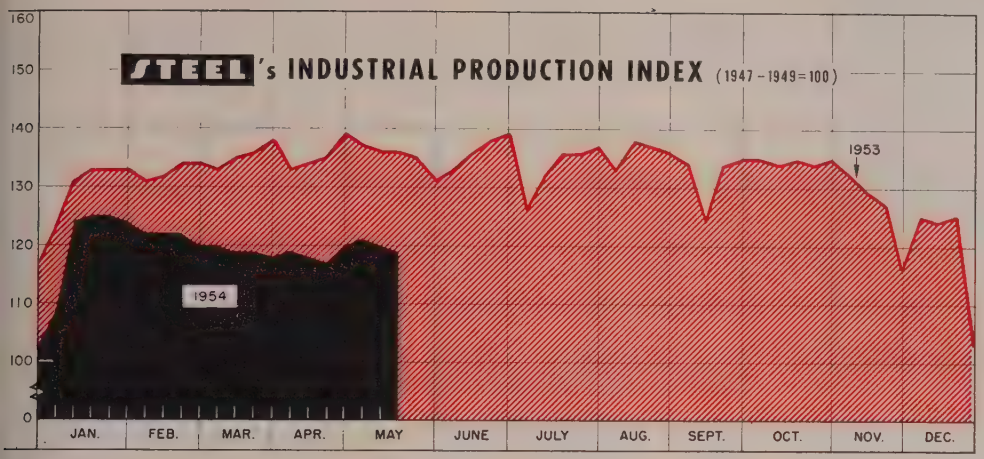


FASTER ASSEMBLY, reduced costs were the pay-off, u RB&W designed wide-flange SPIN-LOCK screws (l for door hinge. Other SPIN-LOCKS (right) hold hi on door. SPIN-LOCK screws *can't loosen* because ratc like teeth lock into surface and hold tight.

RB&W

109 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRO

Plants at: PORT CHESTER, N.Y.; CORAOPOLIS, PA.; ROCK FALLS, ILL.; LOS ANGELES, CALIF. *Additional sales offices at:* ARDMORE (PHILA.), PITTSBURGH; DETROIT; CHICAGO; DALLAS; SAN FRANCISCO. *Sales agents at:* PORTLAND, SEATTLE. *Distributors from coast to coast.*



LATEST WEEK*	119
PREVIOUS WEEK	120
MONTH AGO	117
YEAR AGO	136

Week ended May 15

Based upon and weighted as follows: Steel Output 35%; Electric Power Output 32%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 11%

ndo-China Endangers Normal Business Upturn

UST WHEN the downward busiess adjustment is leveling off and ıost experts are looking forward to normal, healthy recovery in a cilian economy, the possibility of nother "hot war" in the midst of ıe "cold war" continues to threatı to throw the monkey wrench ıto the works. If that actually appens, we will return to the guns nd butter economy, and with it ill come the familiar and unanted inflation.

There is little doubt that the ottom of the adjustment valley as been reached. Most factors ave been indicating it for some ime, and each passing week forties the belief that the upturn is not ar away, if left to its own deices. STEEL's production index, or instance, has been hovering round the 118-120 level (1947-949 = 100) since early March and hows no signs of going lower. Alo, the over-all employment picture s showing strength even though actory employment is still falling. ecretary of Commerce Weeks has aid that, based in part on reports f the department's Business Adisory Council, he believes "we are eaded out of this repression, or hatever you want to call it." Nevrtheless, until President Eisenower and his aides make some lear-cut decisions about what kind of a war it's going to be in Indo-China, the extent and nature of the upturn will be a matter of much conjecture.

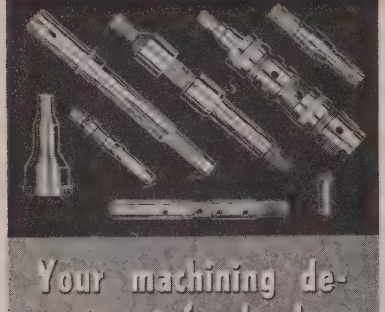
Reality Isn't So Bad . . .

Until that happens, we have to live in the world of reality, and that isn't as bad as some sources earlier this year predicted it would be. Commerce department figures reveal that the gross national product—production of goods and services—for first quarter was at an annual rate of $357.8 billion, or just 1.5 per cent below the first

BAROMETERS OF BUSINESS

	LATEST PERIOD	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,636	1,654	2,262
Electric Power Distributed (million kwhr)	8,446[1]	8,438	7,959
Bitum. Coal Output (daily av.—1000 tons)	1,130	1,113	1,473
Petroleum Production (daily av.—1000 bbls)	6,480[1]	6,422	6,359
Construction Volume (ENR—millions)	$344.0	$494.0	$252.6
Automobile, Truck Output (Ward's—units)	151,797	154,640	177,305
TRADE			
Freight Car Loadings (unit—1000 cars)	650[1]	648	780
Business Failures (Dun & Bradstreet, no.)	214[1]	206	165
Currency in Circulation (millions)[3]	$29,759	$29,756	$29,845
Dept. Store Sales (changes from year ago)[3]	−4%	−1%	+9%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$17,834	$20,570	$16,280
Federal Gross Debt (billions)	$271.0	$271.1	$265.7
Bond Volume, NYSE (millions)	$17.0	$18.4	$14.5
Stocks Sales, NYSE (thousands of shares)	10,098	9,936	5,631
Loans and Investments (billions)[4]	$79.9	$79.1	$76.2
U. S. Gov't Obligations Held (billions)[4]	$32.4	$32.2	$29.2
PRICES			
STEEL's Finished Steel Price Index[5]	189.74	189.74	181.31
STEEL's Nonferrous Metal Price Index[6]	212.6	212.2	221.8
All Commodities[7]	111.0	111.0	111.8
Commodities Other Than Farm & Foods[7]	114.4	114.5	113.3

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1954, 2,384,549. 1953, 2,254,459. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.



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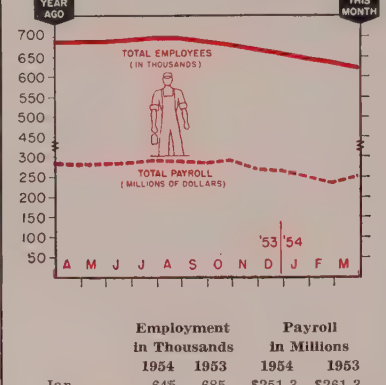
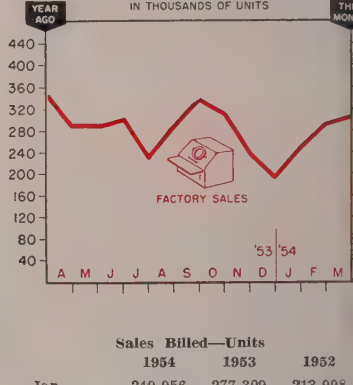
THE BUSINESS TREND



	Employment in Thousands		Payroll in Millions	
	1954	1953	1954	1953
Jan.	645	685	$251.3	$261.3
Feb.	636	685	236.6	261.3
Mar.	621	683	249.7	281.0
Apr.	...	685	....	278.0
May	...	685	....	281.0
June	...	690	....	282.1
July	...	696	....	288.1
Aug.	...	696	....	287.3
Sept.	...	688	....	283.8
Oct.	...	678	....	290.6
Nov.	...	667	....	268.5
Dec.	...	656	....	263.9

American Iron & Steel Institute.



	Sales Billed—Units		
	1954	1953	1952
Jan.	249,956	277,309	213,998
Feb.	295,171	326,604	255,864
Mar.	307,862	345,989	248,431
Apr.	.....	238,474	217,211
May	.....	286,515	213,668
June	.....	304,086	274,457
July	.....	228,268	207,593
Aug.	.....	291,260	254,537
Sept.	.....	340,532	283,732
Oct.	.....	310,867	327,814
Nov.	.....	238,153	293,079
Dec.	.....	191,570	310,661
Totals	.....	3,429,627	3,101,045

American Home Laundry Mfrs. Assn.

Charts Copyright 1954 STEEL.

and fourth quarters of 1953. Compared with the record-high June quarter last year, the current figure is off only 3.5 per cent, which is respectable by any standards. It is true that production of goods is off perhaps 10 to 15 per cent, but the rise in value of services has nearly counterbalanced that decline, leaving a pretty good over-all picture. And in the April survey of the Purchasing Agents Association of Chicago, the PAs reported that they think volume of business is pointing upward in the second quarter. About 37 per cent of the members said there is a spring upturn, and 91 per cent believe that government should not step in to boost the upswing.

What Is Normal? . . .

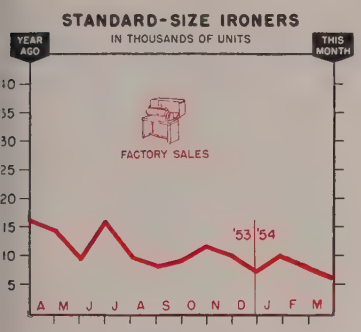
When evaluating a year like 1954, one has to be careful of the yardstick used. At the annual meeting of Republic Steel Corp., T. M. Girdler, chairman, told of a friend who asked him when he expected business to return to normal. Mr. Girdler asked the man what he considered normal. The reply: "Why, the best year I ever had." It must be remembered that you can't break a record every time out, whether it's for the mile run or for the production ru

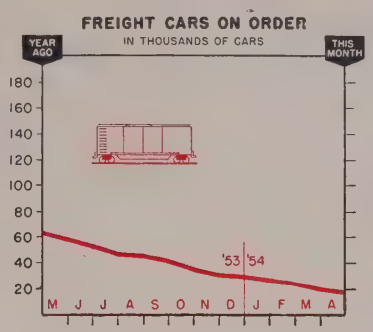
Still Trying for a Record? . . .

But it still looks like the aut motive world is vainly trying to s a record of some kind as the aut makers continue to outproduce th ability of their dealers to sell ne cars. *Ward's Automotive Repor* said the 2-millionth new car of th year was sold on May 17 and tha nationwide estimates of new c sales for April went over the 500 000 mark. Even at that cli dealers' inventories stand at reco levels as the production race co tinues its fast pace. Many belie the day of reckoning is near.

This One May Fall . . .

One record that is endangere this year is construction. F. W Dodge Corp. reports the first fou months of this year set a new hig for that period in the firm's 63 yea in business. The total was abou $5.6 billion. *Engineering News-Re ord* reports the industry is pickin up momentum and that May wi probably set a record in its book for that month. April was only per cent below the record April r reported by this source. ENR ha not been as optimistic in its earli





Factory Sales—Units

	1954	1953	1952
Jan.	9,792	24,395	15,636
Feb.	8,208	22,586	17,630
Mar.	6,025	16,066	13,913
Apr.	....	14,060	8,938
May	....	9,323	12,652
June	....	12,529	17,654
July	....	9,626	15,025
Aug.	....	8,067	16,477
Sept.	....	9,113	22,492
Oct.	....	11,666	25,204
Nov.	....	10,105	19,724
Dec.	....	6,908	16,798
Total	....	154,464	202,143

American Home Laundry Mfrs. Assn.

Awards and Backlogs

	Awards 1954	Awards 1953	Backlogs 1954	Backlogs 1953
Jan.	2,953	5,536	27,959	77,414
Feb.	2,057	2,284	25,441	71,882
Mar.	348	3,379	20,966	68,553
Apr.	909	2,432	17,817	62,637
May	....	1,651	.....	57,345
June	....	1,463	.....	52,315
July	....	1,632	.....	47,423
Aug.	....	3,913	.....	45,735
Sept.	....	3,914	.....	42,198
Oct.	....	1,705	.....	35,171
Nov.	....	2,860	.....	31,869
Dec.	....	2,159	.....	29,950
Total	....	32,928		

American Railway Car Institute.

reports as Dodge has. But while the two differ over the short run—because of their different approaches to the problem—they usually reach the same conclusions in the end.

Steel Still Stymied . . .

Meanwhile, steel production is still waiting for the shot in the arm that will lift it into the 75-per-cent-of-capacity bracket predicted for it by many. American Iron & Steel Institute predicted the level would be 70 per cent for the week ended May 23. An increase in orders, mostly of the hand-to-mouth variety, indicates the bottom of the inventory barrel is not too far away, but don't look for the 75-per-cent rate tomorrow.

Regardless of the lower operating rate, steel employment has held up well when compared with the more "normal" years before 1951. The first three months of 1954 averaged 633,800 employees making an average of $2.292 an hour.

Profits Did Pretty Well . . .

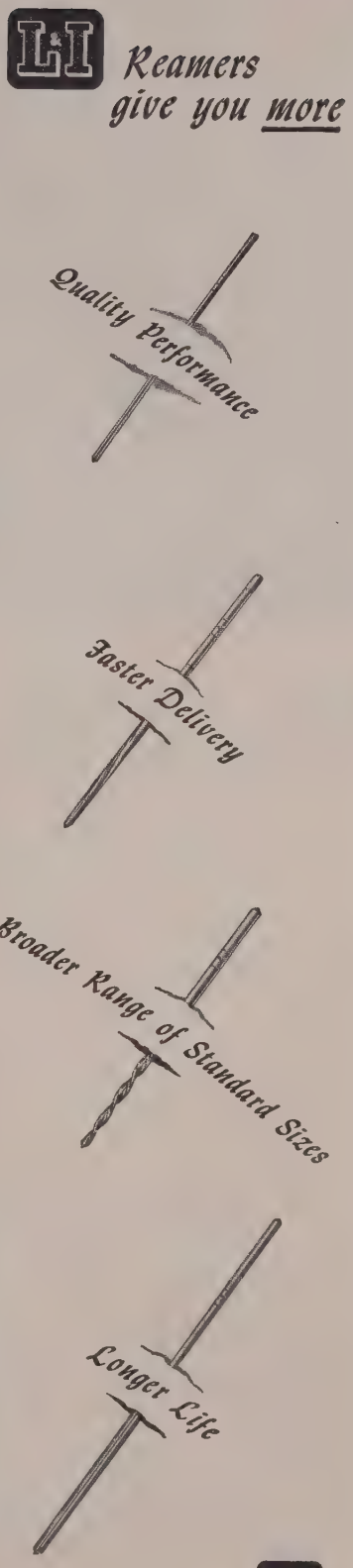
Two recent surveys point up the effects during first quarter of the end of excess profits tax and more attention to cost cutting and efficiency. National City Bank of New York, in studying quarterly statements of 570 leading corporations, found the combined profits of the group were $1482 million for the first three months of this year compared with $1390 million for last year's first quarter, despite reduced sales in 1954. Cleveland Trust Co. studied 201 reports and found that 68 corporations reported sales up while 133 reported sales down. But, 95 of them reported profits after taxes were up and 106 reported lower profits.

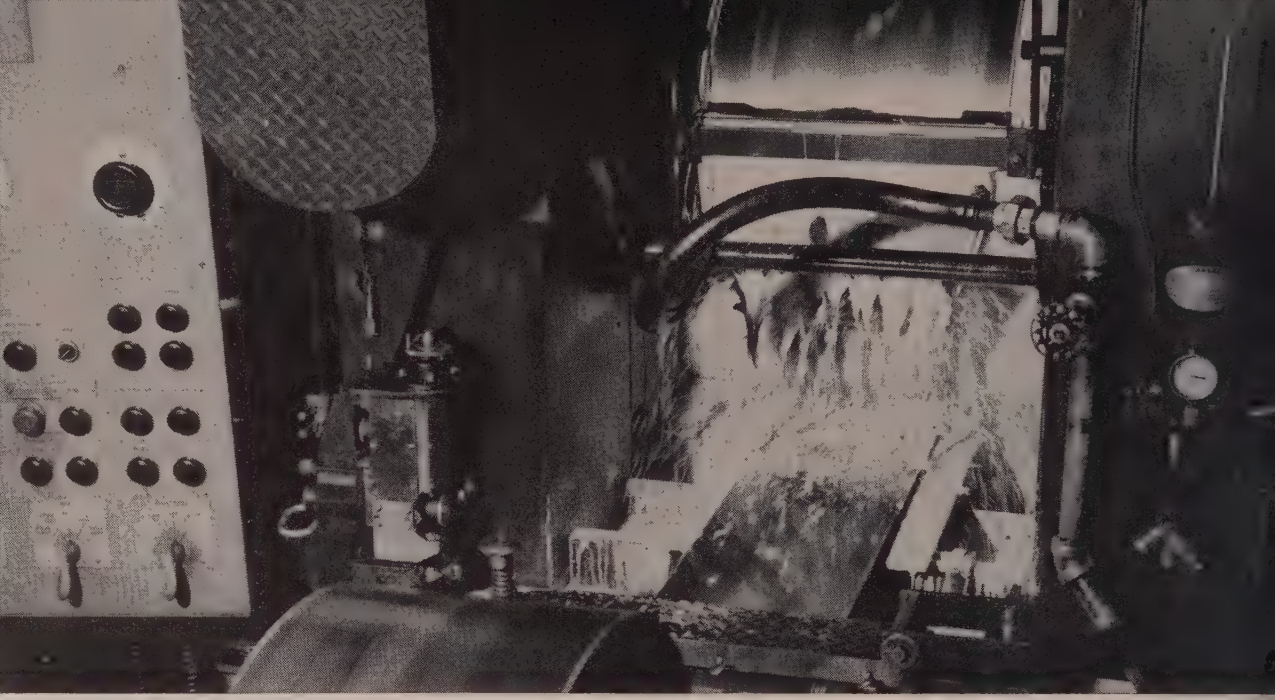
No Resistance for Power . . .

Regardless of what happens in other segments of the economy, electric power keeps charging ahead. After a mild decline in March and April, Edison Electric Institute reports that generators are once more putting out about 6 per cent more power week after week this year then they did for similar weeks in 1953.

Farm Implements Look Better . . .

John L. McCaffrey, president of International Harvester Co., told the annual meeting of the firm that there are signs that farm equipment sales will show an improvement in the second half.





NEW SUNOCO EMULSIFYING ROLLING OIL
EASIER TO USE, LASTS LONGER

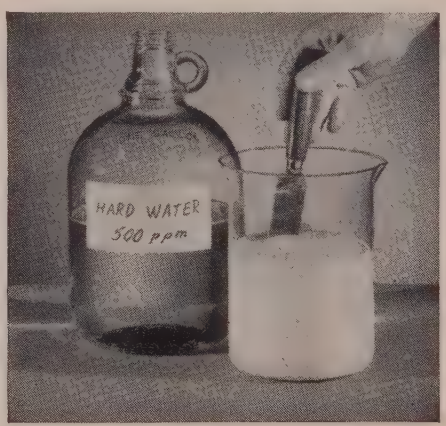
It mixes readily in hard or cold water—forms whiter and more stable emulsions that can be used for a longer time. The lower viscosity of new Sunoco Emulsifying Rolling Oil makes it easier to pump from storage tanks. These improvements are the result of improved refining techniques made possible by several new multimillion-dollar refining units.

Users report cleaner rolls, reduced spalling, and absence of gumming. The result is lower power consumption and higher mill speeds—as much as 50% in many cases. In the annealing operations, Sunoco Emulsifying Rolling Oil burns off cleanl usually making cleaning unnecessary. All of these advanta contribute to lower cost operation.

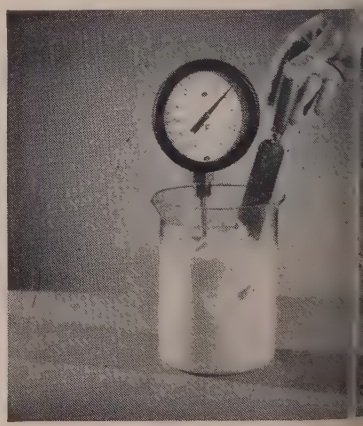
You can also use Sunoco Emulsifying Rolling Oil advant ously for rust proofing hot rolled sheets after pickling, an a die lubricant in cold drawing steel bars.

The full story about this new oil is well worth your listen Care to hear it? Just contact your Sun Oil Company re sentative. Or write Dept. S-5.

TESTS SHOW HOW READILY THIS NEW OIL FORMS STABLE EMULSIONS



HARD WATER—Tested in dozens of samples of water obtained from industrial plants having hard water problems. Never failed to form a stable emulsion.



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W. W. FRYMOYER
. . . named vice president at Foxboro

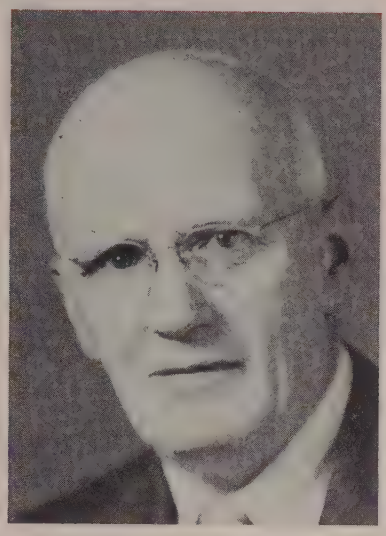
/. **W. Frymoyer** was elected a vice resident of **Foxboro Co.**, Foxboro, lass. He joined the firm in 1926 nd became general superintendent 1 1939. Since 1951 he has been ictory manager and continues in iat capacity, supervising all in- rument manufacturing activities.

awlins Bros. Steel Division of So- r Steel Corp., Los Angeles, ap- ointed **Harry D. Curtis** general anager, **Walter I. Wilson** assist- nt manager, and **Seymour Jacoby** omptroller. Rawlins Bros. Co. was cquired by Solar Steel last Janu- ry. Mr. Curtis previously was olar's general manager of sales, ar and tube, at Detroit.

el Moerick was made vice presi- ent-sales and **A. L. Topp** vice pres- ident-engineering by **A-P Controls orp.**, Milwaukee.

lenry W. Doctor was made district ales manager, tubular products di- ision, **Babcock & Wilcox Co.**, in harge of the newly created office 1 Cincinnati.

t Pollak Steel Co., Cincinnati, **Al- ert C. Weihl**, former vice presi- ent-general manager, was pro- oted to executive vice president- eneral manager. **W. R. Klinicht** s now vice president and assistant eneral manager, **C. L. Volkman** ice president and manager of con- truction material sales and **David 'ollak** vice president.



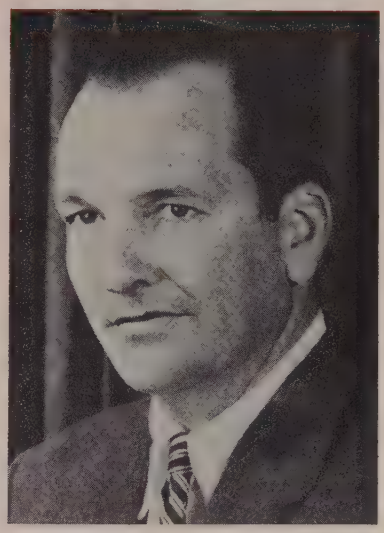
GEORGE W. INGHAM
. . . U. S. Air Conditioning v. p.

George W. Ingham was elected vice president in charge of production at **United States Air Conditioning Corp.**, Minneapolis. He joined the company in 1950 as assistant to the works manager. He previously served as general superintendent in charge of air conditioning at Worthington Corp.'s plant in Holyoke, Mass.

Cooper-Bessemer Corp., Mt. Vernon, O., created three primary engineering divisions. Promoted to chief engineer, development division, is **W. R. Crooks. R. F. Lay** is chief engineer, product division, and **T. O. Kuivinen** chief engineer, technical division. The programs of the three divisions will be coordinated by **E. Frederick**, now executive engineer.

Carl H. Fisher was made superintendent, tool bit department, at the **Sanderson-Halcomb Works** of Crucible Steel Co. of America at Syracuse, N. Y. **Charles E. Kirk** was made superintendent of the cold-rolled division of the **Spaulding Works** at Harrison, N. J.

Pittsburgh Standard Conduit Co., Pittsburgh, transferred **W. C. Godfrey**, assistant sales manager, to its new Morrisville, Pa., plant. Replacing him at Pittsburgh is **John A. Eitel** who also is responsible for sales in the western Pennsylvania area.



WARWICK J. HAYES JR.
. . . Industrial Brownhoist gen. sales mgr.

Warwick J. Hayes Jr., former sales representative at the Cleveland offices of **Industrial Brownhoist Corp.**, was named general sales manager with headquarters at the main plant in Bay City, Mich. **Stanley R. See**, former district sales manager at the Philadelphia offices, was named to the newly created post of director of sales for the eastern division in charge of the Atlantic Seaboard area.

Eugene B. Hotchkiss was named a vice president of **Vitro Corp. of America**, in charge of new products. He has headquarters at the New York executive offices. For the last eight years Mr. Hotchkiss has been vice president, New Enterprises Inc. He is also chairman of Cro-Plate Co. Inc., treasurer of Vibro Dynamic Engineering Inc. and a director of Kaman Aircraft Corp.

James P. Falvey was elected executive vice president, **Electric Auto-Lite Co.**, Toledo, O. Vacancies of chairman and president, resulting from the death May 1 of **Royce G. Martin**, have not been filled. Mr. Falvey has been head of the firm's legal and industrial relations departments.

Percival Steel & Supply Co., Los Angeles, elected **Emanuel Jungquist** chairman of the board and treasurer, **H. W. Pearcy** president

CHARLES W. SANFORD
. . . Jack & Heintz v. p.-manufacturing

RAY W. MACDONALD
. . . Burroughs export operations v. p.

JAMES M. MEAD
. . . vice president of Ryerson

and **E. Roscoe Phillips** vice president-secretary.

Jack & Heintz Inc., Cleveland, elected **Charles W. Sanford** vice president-manufacturing and **John E. Ault Jr.** comptroller. Mr. Sanford was works manager, assuming that position in February, 1953. Prior to that he served seven years as assistant works manager for Whirlpool Corp. and one year for Evinrude Division, Outboard Marine & Mfg. Co. Mr. Ault formerly was with Houdaille-Hershey Corp.

R. A. Hastings, former vice president, Continental Industrial Engineers Inc., joined **Lindberg Engineering Co.** to head up the sales department of a new division.

E. Paul Lynch was appointed vice president, **Commercial Contracting Corp.**, Detroit. He is in charge of a new office opened in Flint, Mich.

New vice presidents elected at Admiral Corp.'s **Midwest Mfg. Corp.**, subsidiary at Galesburg, Ill., include **L. H. Moos,** former general manager, now vice president-general manager; and **Evans T. Morton,** also director of engineering of Admiral major appliances.

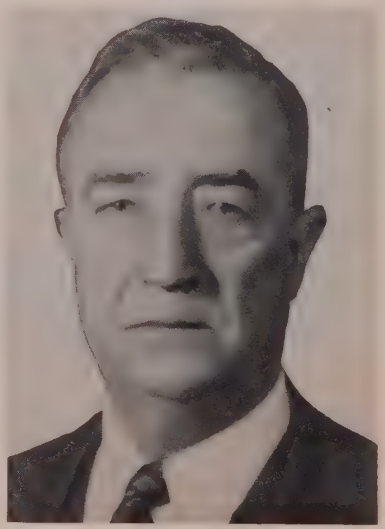
Inland Steel Co., Chicago, reorganized its finance department under the general supervision of **Russell L. Peters,** formerly vice president-treasurer. He is now financial vice president and chairman of the finance committee of the board of directors.

Ray W. Macdonald, general manager of international operations, was named vice president of **Burroughs Corp.**, Detroit. He is in charge of sales and service operations outside U. S. and Canada.

Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., elected **John E. McCauley** chairman of the board and chief executive officer. President for the last 20 years, he is succeeded by **G. Clymer Brooke,** promoted from executive vice president. **James M. Heppenstall** was advanced from treasurer to vice president-treasurer and **Arlan L. Wentzel** was made vice president and works manager.

James M. Mead was elected a vice president and director of **Joseph T. Ryerson & Son Inc.**, Chicago. He succeeds **Ainslie Y. Sawyer,** retired. Also elected to the board is **Russel L. Peters,** financial vice president of Inland Steel Co. Mr. Peters succeeds **Everett D. Graff,** retired who was president of Ryerson from 1937 to 1951. Mr. Mead, who has been assistant vice president at the Chicago plant, is now in charge of procurement for the company.

S. N. Johnson becomes vice president - automotive manufacturing and **E. A. Bovee** vice president Duo-Therm Division of **Motor Wheel Corp.**, Lansing, Mich. The



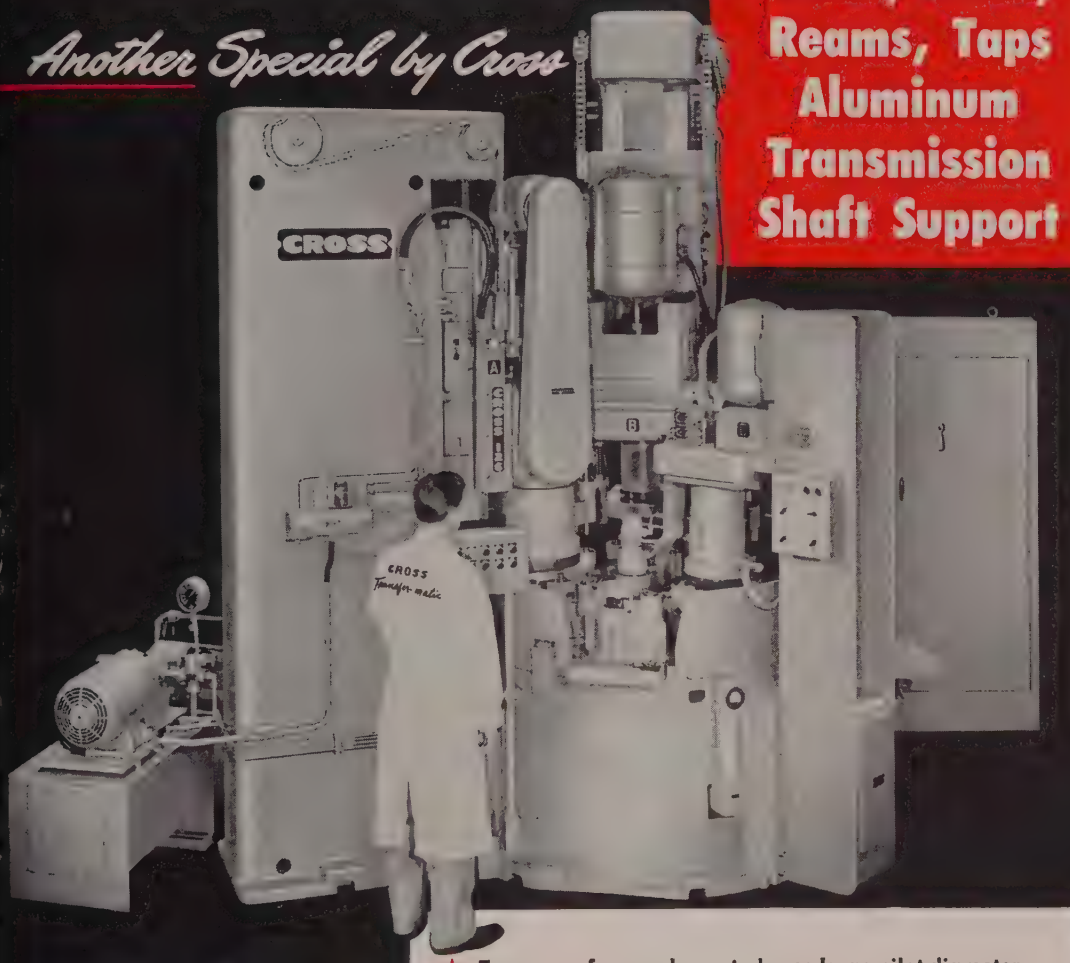
JOHN E. McCAULEY

G. CLYMER BROOKE

. . . chairman and president of Birdsboro Steel

Another Special by Cross

Bores, Drills, Reams, Taps Aluminum Transmission Shaft Support



- ★ Turns rear face and counterbores large pilot diameter, drills 6 holes, drills and reams 2 locating holes, chamfers and taps 5 holes.
- ★ 128 aluminum castings per hour at 100% efficiency.
- ★ 6 station fluid motor driven index table with 1 loading and 5 working stations.
- ★ Hydraulic power clamping for work holding fixtures.
- ★ Complete interchangeability of all standard and special parts for easy maintenance.
- ★ Other features: Hydraulic feed and rapid traverse; hardened and ground ways; filtered coolant system; construction to J.I.C. standards; automatic work cycle.

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DETROIT 7, MICHIGAN

Special MACHINE TOOLS

SELDEN E. DOUGHTY
. . . production mgr., Carpenter Tube Div.

W. E. MULLESTEIN
. . . Lukens Steel gen. sales mgr.

HENRY Z. CARTER
. . . exec. v. p., Avondale Marine Ways

succeed, respectively, **J. A. Watson** and **R. A. Cole,** new executive vice presidents.

Selden E. Doughty was made production manager of Carpenter Steel Co.'s **Alloy Tube Division,** Union, N. J. He previously was chief metallurgist at the Union mill.

Ray C. Conner heads a new automotive products sales group at **Vickers Inc.,** Detroit, a division of Sperry Corp. The new group is concerned with sales of Vickers products used on passenger cars as well as trucks made by passenger car manufacturers.

Alan Wood Steel Co., Conshohocken, Pa., elected **Harleston R. Wood** vice president in charge of planning and development.

John W. Frazier was made field manager of air filter sales by **American Air Filter Co. Inc.,** Louisville. He has offices in the Oliver building, Pittsburgh, and will work with the various district sales offices of the company. He formerly was general sales manager of Trion Inc.

Lukens Steel Co., Coatesville, Pa., appointed **W. E. Mullestein** general manager of sales. He has been manager of field sales since 1947. In his new position he will be a member of the company's management committee. **Ben R. Slocum** was made personnel administration manager and **Harry H. Morton** is acting supervisor of employment in the industrial relations division.

William F. Martin resigned as president of **Syracuse Alloy Metals Corp.,** Syracuse, N. Y. Purchase of Mr. Martin's stock in the corporation was made by **Leonard E. Gay,** presently affiliated with Gulf Oil Co., who will devote full time to his newly acquired manufacturing interests.

Harry K. Taylor was named assistant vice president in charge of operations for **Jessop Steel Co.,** Washington, Pa.

Robert J. Krieger was named vice president in charge of sales for **Riley Stoker Corp.,** Worcester, Mass. **Franklin G. Treat** was named vice president of the Detroit plant.

Avondale Marine Ways Inc., New Orleans, elected **Henry Z. Carter** executive vice president and a director. He was general manager.

Fred W. Beitner was appointed manager of sales for the northeastern territory of **Trent Tube Co** subsidiary of Crucible Steel Co. of America. Mr. Beitner's new headquarters are in the Chrysler building, New York. He was sales manager, Pittsburgh-Cleveland area.

Leonard R. Constantine was appointed plant manager of the Catasauqua, Pa., plant of **Fuller Co.** He has been welding engineer for Elliott Co. and previously served M. W. Kellogg Co. from 1945 to 194 as assistant welding engineer.

George W. Stanley Jr. was made general manager, **Solar - Sturge Mfg. Division,** Pressed Steel Ca Co. Inc., Melrose Park, Ill.

C. B. Holst is manager of the new ly formed engineering administration department, tractor and implement division, **Ford Motor Co** Birmingham, Mich.

OBITUARIES . . .

Lloyd D. McDonald, 60, since 1950 executive vice president, **Warner & Swasey Co.,** Cleveland, died May 15.

James G. Begley, vice president, **Townsend Machine Co.,** Albany, N. Y., died May 6.

Charles Hopson, 62, general superintendent, **National Screw & Mfg. Co.,** Cleveland, died May 11.

William C. Shuck, 78, vice president and director of **Lockhart Iron & Steel Co.,** Pittsburgh, died May 11

James Moffatt, vice president, **Milford Crane & Machine Co.,** Milford Conn., died May 8.

Charles R. Crane II, 61, vice president and director, **Crane Co.,** Chicago, died May 8.

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New Kearney & Trecker milling machines and precision boring machines...available for leasing... can help improve your competitive position and PROFITS

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Kearney & Trecker's Tool-Lease Program offers operating management a way to stop the trend of rising costs, increasing competition and shrinking profit margins. With Tool-Lease, you can enjoy optimum flexibility to meet changing production requirements while avoiding the risk of high obsolescence. What's more, Tool-Lease provides a way to keep your plant modern without tying up working capital.

TOOL-LEASE OFFERS A CHOICE OF PLANS TO MEET INDIVIDUAL NEEDS

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MACHINE TOOLS
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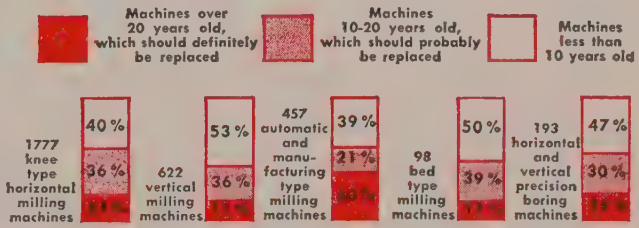
MACHINE TOOL OBSOLESCENCE IS BECOMING CRITICAL! WHERE DO YOU STAND?

Here's the picture in a typical basic industry — CONSTRUCTION, MINING & OIL WELL EQUIPMENT — (see chart below). Of the 3300 standard knee type horizontal, vertical, bed and manufacturing type milling machines and precision boring machines in use today — *which could be replaced by Tool-Lease* equipment — 33% are 10-20 years old, 23½% are more than 20 years old!


Machines over 20 years old, which should definitely be replaced
Machines 10-20 years old, which should probably be replaced
Machines less than 10 years old
1777 knee type horizontal milling machines
40 %
36 %
622 vertical milling machines
53 %
36 %
457 automatic and manufacturing type milling machines
39 %
21 %
98 bed type milling machines
50 %
39 %
193 horizontal and vertical precision boring machines
47 %
30 %

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Company.....

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City.....Zone.....State.....

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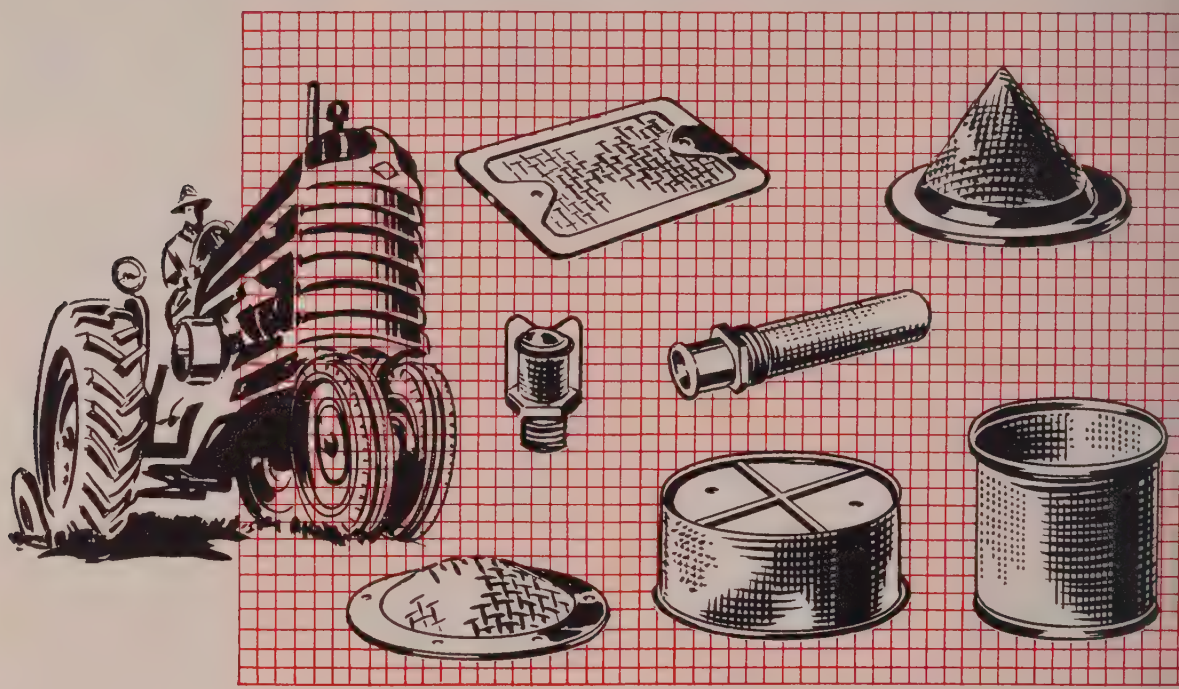

Farm machinery must keep on keeping-on. From sewing seed to harvesting crops—everything must be done when the time is *right.*

That's why the wire screen cloth that does its job so unfailingly in so many small but vital farm machinery parts *is* important.

In the farm tractors' spark arresters, radiator grilles, brake linings, air cleaners and in all the various filters and screens using Reynolds wire cloth—failures are screened out and dependability is *screened in.*

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NATIONAL-STANDARD...*Niles, Mich.*.....Tire Wire, Fabricated Braids and Tape
WAGNER LITHO MACHINERY...*Jersey City, N. J.*.....Metal Decorating Equipment
WORCESTER WIRE WORKS...*Worcester, Mass.*....Round and Shaped Steel Wire, Small Sizes

Enlarges Strip Capacity

Alloy Metal Wire Co. installing 4-high Steckel mill and making other improvements

ALLOY METAL WIRE CO., Prospect Park, Pa., is installing a 4-high Steckel mill to increase production of high-quality nickel alloy and stainless steel strip. The company has completed and is now using an addition to its plant in that city and will increase its gas cracking capacity in the near future.

The recently acquired mill, with its added power, will enable Alloy Metal to roll strip in widths up to 6 in. and in thickness down to 0.001 in. The 4-high mill can supply stainless strip in spring temper in all thicknesses down to the same minimum.

Alloy Metal Wire Co. is a division of H. K. Porter Co. Inc., Pittsburgh. The additions to the plant and equipment are in line with the policy of the parent firm to broaden the product base and add facilities which will increase the quality and customers services in each of its nine divisions.

Warehousing Firm Expanding

Brass & Copper Supply Co., Baltimore, purchased warehouse property at W. 23rd and Sisson streets, that city. Following alterations, the property will replace the company's present warehouses in downtown Baltimore.

Instrument Firm To Build

Micron Instrument Corp., Pasadena, Calif., will construct a $300,000 plant in Monrovia, Calif., for manufacture of precision instruments and optical systems. Richard Tishler is president.

Davey Forms Drill Division

Davey Compressor Co., Kent, O., purchased all manufacturing rights to the line of portable rotary drilling units previously produced by Engineering Laboratories Inc., Garland, Tex. Drill unit manufacturing operations at Kent will be handled by a newly-established Davey Rotary Drill Division. Davey produces air compressors, pneumatic tools, truck power takeoffs, automotive field service units and mobile machine shops.

Electroplater Doubles Capacity

American Electro Products Inc., Waterbury, Conn., originator of the Cantavone electroplating processes and techniques, completed construction of a wing which more than doubles the production capacity of its former plant.

Revere Buys Lockport Plant

Revere Copper & Brass Inc., New York, purchased a plant in Lockport, Ill., for the production of Lockseam tube, rolled moldings and shapes, presently made in the firm's Chicago Manufacturing Division. The move will provide additional space for the modernization program at the mill division in Chicago.

Baltimore To Enlarge Port

Baltimore Port & Terminal Corp., Baltimore, submitted to the Port of Baltimore Commission a projected waterfront improvement program, costing $14.5 million. It includes an ore pier with two berths and having an annual capacity of 5 million tons. Pennsylvania Railroad, which would handle traffic from the ore pier, indicates its intention of investing $1,875,000 in rail yards and related facilities.

Warehousing Firm Incorporates

Horace T. Potts Co., Philadelphia, was incorporated under the same name. This steel warehousing firm, founded in 1818, has been operating as a partnership in recent years. Horace T. Potts II, general manager under the partnership, is president of the newly formed corporation. Other officers are Arthur L. Collins and Edward R. Potts, vice presidents; W. C. Spencer Jr., secretary; S. L. Bateman, treasurer; and J. A. Stringer, controller.

Fabricator To Build in Iowa

Pittsburgh-Des Moines Steel Co., Pittsburgh, will build a multimillion dollar plant in Des Moines, Iowa. It will be used for fabricating structural and plate steel and is expected to be completed about Jan. 1, 1955.

Alcoa Opens Chemical Plant

Two of four production units that will comprise Aluminum Co. of America's chemical plant in

New Pump Works Features Mechanized Foundry

Large pump assembly line rounds a corner and stretches away toward the testing floor in Fairbanks, Morse & Co.'s new foundry and manufacturing plant in Kansas City, Kans. Workers assemble a large variety of pumps on this line, mounting Fairbanks-Morse motors to many of them. Plant contains 180,000 sq ft

Bauxite, Ark., are now in full operation. Each unit will produce a different group of alumina chemicals. Carl R. Stout is works manager.

Fabricator To Boost Capacity

Inland Steel Products Co., Milwaukee, maker of steel building specialties, will install additional equipment in its Baltimore plant which will increase, among other items, metal lath output by about one-third. The firm is a subsidiary of Inland Steel Co., Chicago.

ACF To Buy Houston Firm

American Car & Foundry Co., New York, will purchase W-K-M Co., Houston, manufacturer of high-pressure steel valves for oil field and pipeline equipment. ACF will operate W-K-M as a wholly owned subsidiary.

Taylor Chain Opens Plant

S. G. Taylor Chain Co., Hammond, Ind., opened a plant in Pittsburgh.

Smoot-Holman Expands Plant

Smoot-Holman Co. is expanding its plant in Inglewood, Calif., by 20,000 sq ft for manufacture of lighting fixtures and pressed-steel porcelain-enameled plumbing fixtures. C. E. Smoot is president.

Foxboro Builds Branch Plant

Foxboro Co., Foxboro, Mass., manufacturer of industrial instruments for process measurement and control, erected a branch factory in Dallas, providing 13,000 sq ft of floor space.

Sundstrand Forms New Division

Sundstrand Machine Tool Co., Rockford, Ill., divided its Hydraulic Division into two completely segregated entities: Aviation Division and Industrial Division. Sundstrand Aviation will occupy the entire 250,000-sq-ft plant now shared with the Industrial Division, providing doubled production capacity for constant speed drives. All products of the Industrial Division, including the fuel pump for domestic oil burners, will be manufactured in a plant now under construction. Carl L. Sadler is manager of Aviation Division.

Sinews of Steel

Sixty vertical steel cables are being installed to help support the 1200-ton lift span of San Mateo-Hayward bridge across San Francisco bay. Bethlehem Pacific Coast Steel Corp. made the cables, each 157 ft long and 1⅞ in. in diameter, from improved plow steel wire. They were preformed, prestressed and specially treated with a rust inhibitor during manufacture

Construction Firm Organized

Mellon-Stuart Co., Pittsburgh, formed a subsidiary, Mellon-Stuart Industrial Construction Co., to specialize in engineering and construction in the heavy industrial field. R. L. Clark, an expert in the design and construction of blast furnaces, coke ovens and ore preparation plants, is general manager of the new firm.

Ryan Enters New Field

Ryan Aeronautical Co., San Diego, Calif., entered into a new production field, having received a $1-million contract of a classified nature. It involves the fabrication of very large components of stainless steel and aluminum. Considerable welding will be performed in making the new item and an entirely new department is being set up to handle the confidential project. Ryan also is working on a $7-million research and development contract from the Air Force for creation of another classified item. Lawrence M. Limbach was elected vice president-manufacturing.

Vulcan Buys Minnich Machine

Vulcan Machine Co., Waynesboro, Pa., acquired all assets, manufacturing facilities and capital stock of Minnich Machine Works Inc., Landisville, Pa. The new owners will continue to make Minnich baling presses.

Fletcher & Sons Build Plant

F. P. Fletcher & Sons are building a plant in Puente Valley, Calif., for manufacture of stainless steel windows and nailing machines.

New York Firm Changes Name

Compressed Air Products, New York, changed its name to Airoyal Co. The firm makes hydraulic power units and a line of small-bore hydraulic and pneumatic cylinders. It also serves as manufacturers' representative in the sale of hydraulic and pneumatic components.

Textron Diversifies Activities

Textron Inc., New York, is diversifying its operations through acquisition of MB Mfg. Co., New Haven, Conn., producer of vibration control equipment. Another firm now affiliated with Textron is Dalmo Victor Co., San Francisco, manufacturer of airborne radar and associated products.

Opens Tool Steel Warehouse

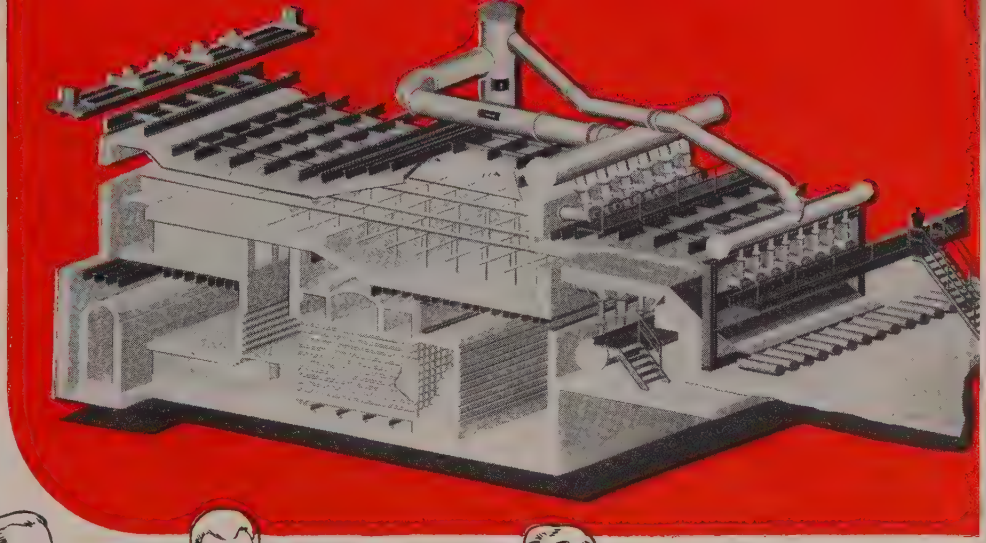
Allegheny Ludlum Steel Corp., Pittsburgh, opened a tool steel warehouse and district sales office at 3800 N. First St., Milwaukee. This facility is part of a long-range expansion program on which Allegheny Ludlum has spent over $80 million for modernization of production facilities since World War II.

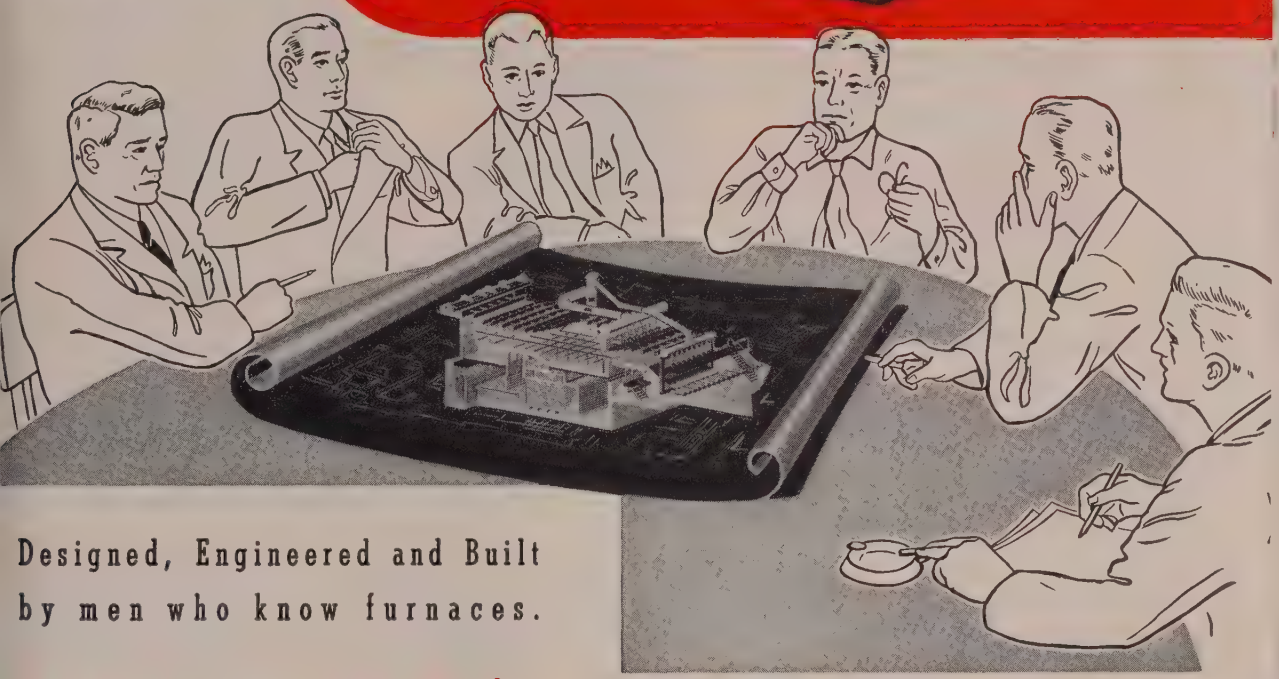
Chase To Expand in Cleveland

Chase Brass & Copper Co., Waterbury, Conn., a subsidiary of Kennecott Copper Corp., New York, plans a $4-million expansion pro-

...or better reheating

SLABS
BLOOMS
BILLETS
BARS, ETC.





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Rust's patented zone-controlled, double or triple-fired, recuperative, continuous furnaces are individually designed to meet specific needs. Each furnace provides positive automatic control of predetermined heating temperature. Flexibility is achieved by simply changing the fuel firing rate in the heating zone. The result is high tonnage output with minimum fuel consumption. In addition to reheating furnaces, Rust builds other types (designed for any fuel) to meet practically all metallurgical heating needs. For either new or modernization projects rely on Rust for the complete job.

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From giants like this to drill presses and lathes, you can save installation time and money by mounting machines on UNISORB pads.

DON'T DRILL FLOORS — Simply use the correct type of UNISORB mounting pads, cement pads to floor and machine base, let dry overnight and the job is done.

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gram. The project calls for additions to the present buildings at its Cleveland plant, as well as the machinery and equipment necessary to effect an appreciable increase in tube production.

Carbidie Inc. Opens Plant

Carbidie Inc. opened its plant at 27 Hillview Ave., Latrobe, Pa., for production of preformed carbide sections up to 8 in. in diameter and 14 in. long. The firm was founded recently by R. J. Steele, Logan J. Harr and E. J. Reitler.

Enameling Firm Expands

Airspray Enameling Corp., Santa Monica, Calif., is expanding its plant for industrial spray painting and baked enameling for government specifications. Claude R. Upshaw is president and general manager.

General Aniline To Build

General Aniline & Film Corp., New York, will build a $6-million plant in Calvert City, Ky., for production of high-pressure acetylene derivatives.

Stamping Firm Organized

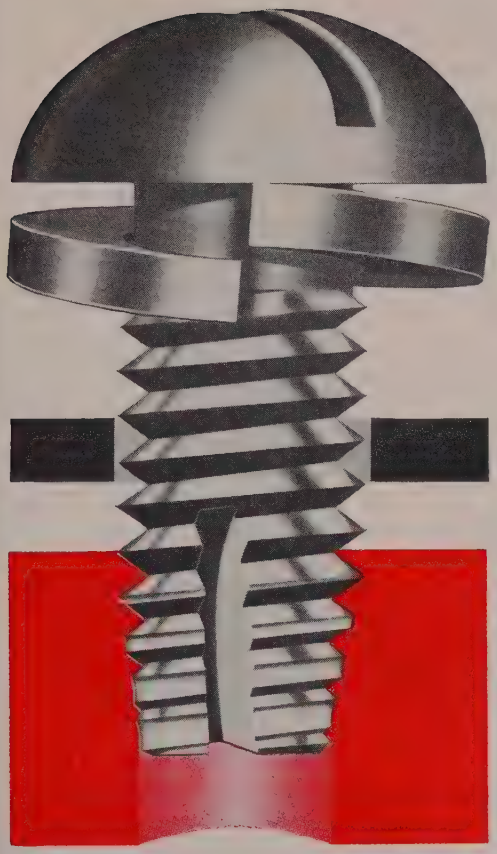
Bolte Products was established in Port Clinton, O., by Jack Bolte for production of steel and aluminum stampings for the automotive trade. Mr. Bolte formerly was associated with Standard Products Co., Cleveland.

Fageol Buys Trans-Main Corp.

R. D. Fageol Co., Detroit automotive parts manufacturer, purchased Trans-Main Corp., Kent, O., and Fageol Heat Machine Co., Detroit. The parent company and all operating divisions are now located in Kent.

Forms Electronics Division

Fairbanks, Morse & Co., Chicago, organized an Electronics Division which will be responsible for research, development, application engineering and manufacture of electronic devices and apparatus used in conjunction with the firm's products. L. J. Maguire is man-



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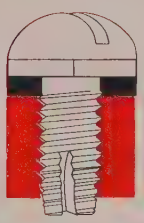

WITHOUT TAPPING

Whether it's a washing machine, turret lathe or locomotive, industrial production men and designers can save time and money by eliminating the need to tap parts before fastening. Design and production engineers in every field of industry can attest to the saving features of Eaton Thread-Cutting Springtites and Sems. They cut their own threads as they're applied thus cutting the cost of a production operation. In addition they seat tightly, thread against thread, eliminating the possibility of stripped or mismated threads.

Made from the finest quality cold drawn steel, Eaton Thread-Cutting Springtites and Sems come in types 1, 23 and 25 making them ideal for use with sheet and stainless steel, die castings and plastics. They are available with or without preassembled spring lock washer. You can test these Eaton cost cutting fasteners by writing for samples and a copy of Engineering Bulletin S-49A.

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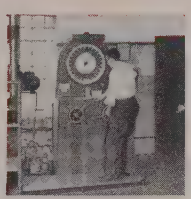

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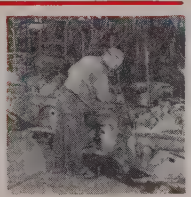

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Here it is . . . an electric furnace control that makes corrections as quickly as arc changes occur!

It's the Whiting Hydro-Arc Electric Furnace Control . . . a control that repositions electrodes *automatically* within 0.05 seconds after a signal is received from the electrode bus that the arc is off-balance. Maximum speed and response because: (1) usually interposed special machinery is eliminated, (2) lost motion is eliminated, (3) friction losses and inertia are reduced and, (4) the load is counterbalanced with an air cushion. Essentially a closed system, the Whiting Hydro-Arc Control uses uni-directional electrode motors that run only in one direction . . . *never reverse.* Watt (furnace heat) input is regulated from an external, fixed, unwavering standard.

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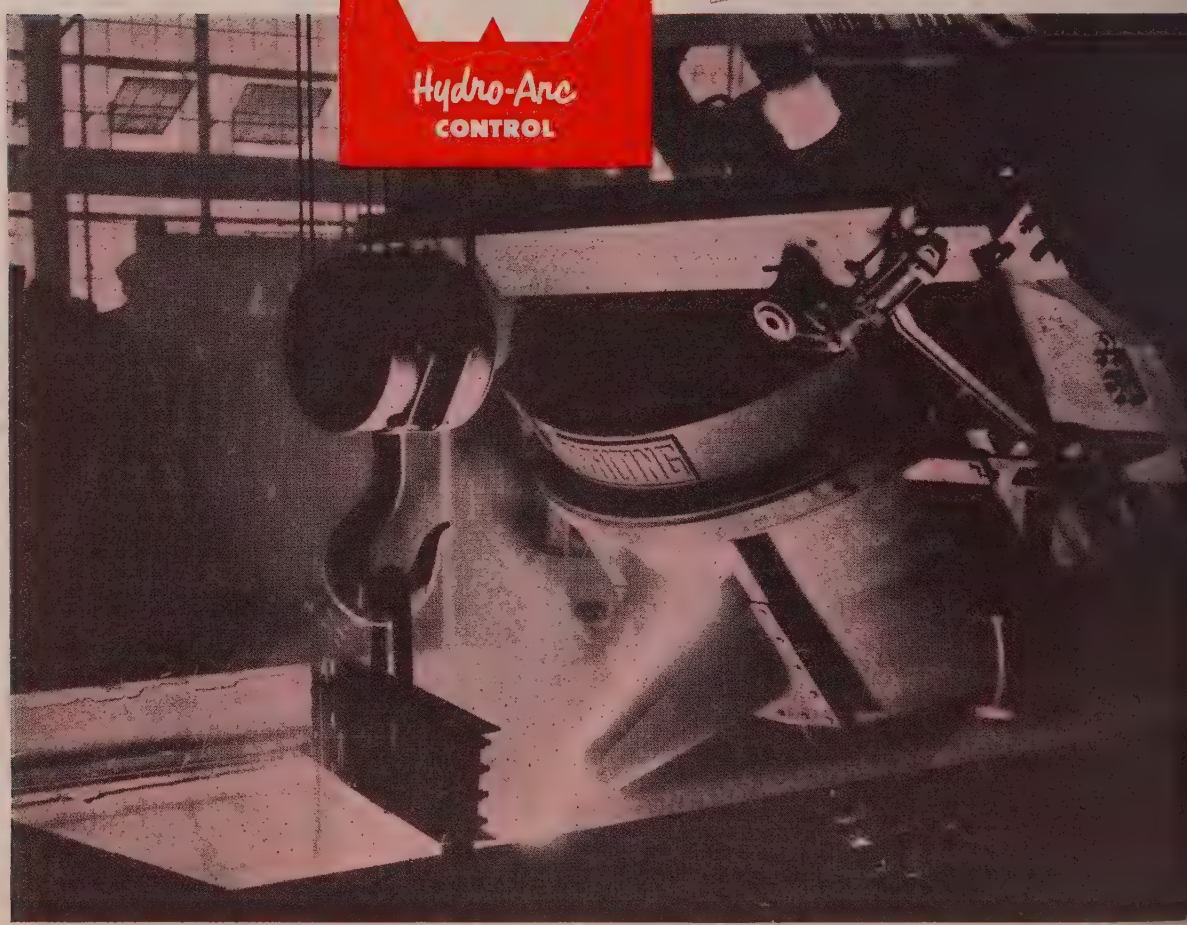

ger of the division with head-
uarters in Davenport, Iowa.

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ction of its Chemical Division.

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anager of distribution of Kaiser
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nce 1947. In 1946 he was assist-
nt to the vice president and gen-
ral manager of the Henry J. Kai-
r Co., Oakland, Calif.

Charles F. Walton, Case Institute
Technology, Cleveland, was ap-
inted technical director of **Gray**
on Founders' Society Inc., that
ty. Prior to his work at Case,
e was foundry service engineer
r Meehanite Metals Corp., New
ochelle, N. Y.

C. Espy Reed, president, Reed
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ected president of **Power Fan**
anufacturers' Association, that
ty. Other officers are J. F. Snow,
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., 2nd vice president; and G. W.
cCormick Jr., secretary-manager,
ith headquarters in Detroit.

how DE-STA-CO makes specialties S.O.P.*

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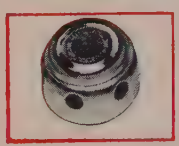
Forty years' experience in the stamping business has taught us the value of giving our customers certain processing procedures which are ordinarily considered "extras". This policy of considering your needs first is largely responsible for our consistently rapid growth.

Close tolerance coining is one of the production methods that DeStaCo offers, not as a specialty, but as a Standard Operating Procedure. Our knuckle-action presses accommodate up to 400-ton capacity . . . frequently save you the additional expense of a grinding or machining operation.

Our precision parts department turns out critical stampings such as refrigerator intake and discharge valve reeds. These parts are made of heat-treated and ground imported DeStaCo valve steels. Our own Iso-Finish method provides a sealed-edge, strain-relieved surface for long life.

High-volume production of small, intricately-formed parts is done by Multi-Stamping. This is an entirely automatic method of processing complete parts in a single 4-slide machine. Progressive dies used in this operation are made in our own tool and die department.



Our production facilities include a number of high-speed, automatic presses to process your parts at the lowest possible unit cost.
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Other DeStaCo specialties are Toggle Clamps for jigs and fixtures, Precision Washers, Arbor Spacers and Shims, Shim and Feeler Stock.

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Write us for our Stamping brochure

DE-STA-CO DETROIT STAMPING COMPANY

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(*Continued from page* 60)

1953), the result can only be to reduce the funds available for investment in new enterprise. There is a net annual increase of 600,000 to 700,000 in the labor force each year. To absorb this rapidly expanding labor force calls for vast amounts of new capital expenditures. Reduction of available capital will sharply reduce new job opportunities and thus increase unemployment.

Who Pays?—Little has been said about who really pays the supplemental unemployment compensation benefits. Unions like to emphasize that profits are fabulous and can stand the additional assessment. This view is for popular consumption because labor leaders as well as every business man know profits are modest and for many companies are nonexistent. Unless the cost of providing benefits can be passed on to the consumer, thousands of small businesses will be destroyed. Even the recipient of the benefits is then affected.

The wage earner may only be asking for the right to work, but he has also demonstrated on numerous occasions that he will exercise his freedom of choice to refrain from seeking employment while receiving guaranteed income equal to 75 per cent of working pay, some of it tax free. A survey recently conducted by Opinion Research Corp. reveals that among union members themselves 77 per cent agree that under such a plan a good many people would rather be laid off than working.

Leisure a Bargain—This is not to say the American working man is a chiseler and a cheat. He is fundamentally honest and wants to do an honest day's work, but neither is he stupid. It was Senator Vandenberg who once said, "We in the United States are notoriously a nation of bargain hunters." Few men will work when they can find a bargain so attractive that they will be paid for staying home an amount almost equivalent to full-time pay.

Much has been said about the limited liability which the employer would assume under the proposal which the United Steelworkers are advancing. Every employer should recognize that this argument is only good for this year. If unemployment should reach proportions sufficient to exhaust the fund into which the employer is to pay 10 cents per man-hour worked the pressure would be great to expand the employer's liability. Witness efforts of the coalminers to gain security. Employers' payments started at 5 cents per ton and quickly rose to 40 cents for bituminous and 50 cents for anthracite. Even then the end is not in sight, for recently benefits were cut 50 per cent as the fund became more and more depleted. Let no one believe that once the fund is exhausted this liability limitation would remain long in force.

Penalizes Long Service—Workers with the shortest seniority would be the first laid off and the first to draw benefits. Employees with longer service would be discriminated against since in the final analysis, payments into the fund, like money for fringe benefits, are really a withholding of wages.

An even greater unfairness develops when layoffs increase to include employees with higher seniority only to find the fund has been depleted by those employees with the shorter service. All of this suggests a new definition of seniority—"the right to work and support those not working."

Cost Forecasting Impossible—There is no known scientific way to determine how much supplementing unemployment compensation would cost because it does not lend itself to actuarial forecasting. In the case of pensions with which the unions have identified the demands in establishing the principle of supplementation, it is possible with a great deal of accuracy to determine the liability of the employer. We know the retired persons are out of the labor market and can be expected collectively to receive calculated amounts for a specified time. A pensi-

(*Please turn to page* 92)

Security through Progress

IN our dynamic economy it is the choice of the consumer in spending his income that in the final analysis determines for all of us what our jobs will be and what we will produce. And competition always offers the producer or seller the opportunity to profit by providing a new service or new product for the consumer. That is the basis of our tremendous productive capacity and the reason why we have such high living standards and why these living standards are continually advancing. This type of economic freedom depends upon the mobility of labor and capital and the freedom of the consumer to spend his income as he chooses. Of course, it also means that people must shift jobs as consumer choices for products and services shift. This may create some insecurity, but in a free economy it is essential to progress.

If we adopt in American industry any program which ties the worker to a particular job or employer and places high fixed costs upon producers so that they are hesitant to embark upon the creation of new products or new services, we will have undermined one of the main supports for our tremendously productive economic system and the high living standards which our people enjoy.

Ultimately, this is the great danger in such schemes as the guaranteed annual wage.

George T. Fonda
Vice President
Weirton Steel Co.

"J&L 1200"

COLD FINISHED CARBON STEEL

Use "J&L 1200" steel on your tough jobs for

- tops in quality
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"J&L 1200" Steel provides the qualities that help machine operators do top-flight work at lower overall costs. With "J&L 1200," the operator obtains: *better machine finishes . . . longer tool life . . . higher rates of speed.* This fact has been proven time and again—in shop after shop.

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Try this steel in your own shop. Results will convince you "J&L 1200" deserves to be a regular specification for your production runs.

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1894-CH

CHANDLER PRODUCTS CORPORATION

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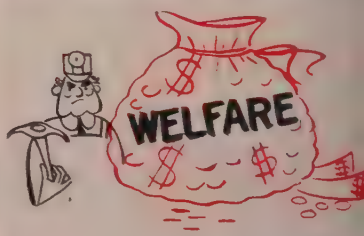
(*Concluded from page 90*)

trust fund and a trust fund for sup plementing unemployment com pensation are not comparable, an to identify one with the other i misleading.

No one has yet been able to de termine how the business cycl will operate or how it will appl to any given employer.

Codetermination — Unions hav long advocated joint studies an



Horrible example: Miners' Fund

joint committees with management Well-known labor leaders hav stated that a guaranteed wage pla would be administered by a join board having equal representatio from the union and managemen with an impartial chairman t break deadlocks. In one word thi is "codetermination." It mean that if employment might be di rectly or indirectly affected, an management action must be agree to by the union. The establishin of prices, setting production sched ules, building new plants, purchas ing new equipment, developing ne products, locating new enterpris and thousands of other decision made by management each da would be subject to the whims o labor leaders. Still while insistin on participation in management de cisions, the unions have always dis claimed any of the responsibilitie of management.

Security Through Growth — I security for workers is the rea aim, it can be achieved only by en couraging investment in more en terprise to provide more jobs t produce more goods for all of u to enjoy. The great developmen of our country did not happen b accident. It came because ther were strong incentives to work, t provide the tools of production an to retain the freedom for whic our forefathers fought so hard. W do not need the phoney securit of "creeping Europeanism." It i in that direction which the guaran teed annual wage would lead us.

he answer to most of your questions about stainless eels are right at your finger tips, when you use Crucible's nique new Stainless Steel Selector.

Want to know the machinability characteristics of a ainless grade? Resistance to corrosion or scaling? Physi-l or mechanical properties? You can get the answers to ese and other questions simply by setting the arrow on e Selector slide at the proper window. It's just as quick nd easy as that.

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STEEL MILLS Rely on Y&M

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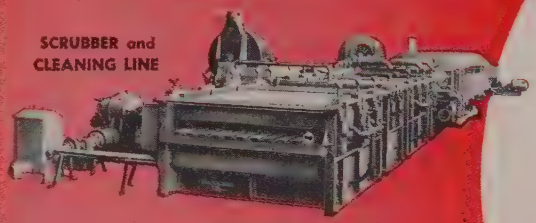
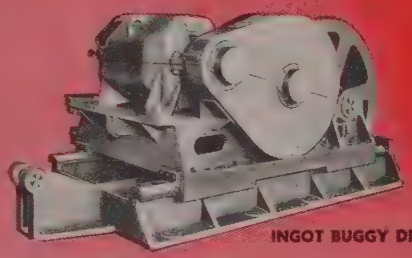
MACHINES, EQUIPMENT, ROLLS AND CASTINGS



SCRUBBER and CLEANING LINE



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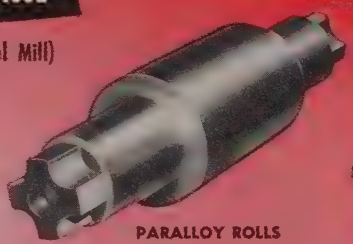
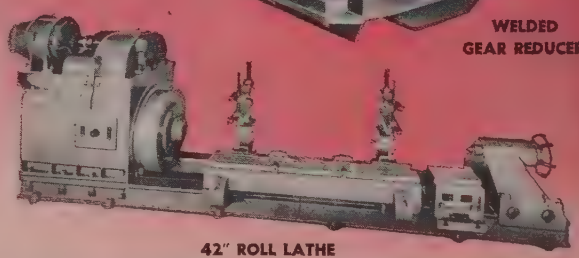


PARALLOY ROLLS

WELDED GEAR REDUCER



42" ROLL LATHE

The Youngstown Foundry & Machine Co.

OVER SIXTY YEARS OF SERVICE TO THE STEEL INDUSTRY

Youngstown, Ohio

6*

Technical Outlook

STEEL EXTRUSION— A significant paragraph from a recent paper delivered abroad by the father of hot extrusion of steel, M. J. Sejournet, reads . . . "Recently we succeeded in extruding carbon steel rods with one or several cores made up of various materials, the core being parallel to the axis of the rods and having only 0.004-inch diameter. It may be that one day such rods will give solution to some unsolvable problems."

TITANIUM— Cost of high-quality sponge may be substantially reduced by an electrolytic process under development at Shawinigan Water and Power Co., Montreal. Researchers say the work is now ready for the pilot-plant stage.

SLOW LEAK— Leaks of one-drop-a-year magnitude can be detected by a technique developed by Babcock & Wilcox Co. Vessel being tested is filled with helium. Amount of gas that escapes is measured by a mass spectrometer. Technique is being used in atomic energy applications.

TRACER WORK— Alcoa researchers are using radioactive tracers in lubricant evaluation, corrosion-resistance studies, analytical chemistry, alloy development and metal flow during extrusion. In corrosion studies, a piece of metal is immersed in a corroding solution containing radioactive material. When metal is removed from the solution, a Geiger counter is used to check corrosion material pickup.

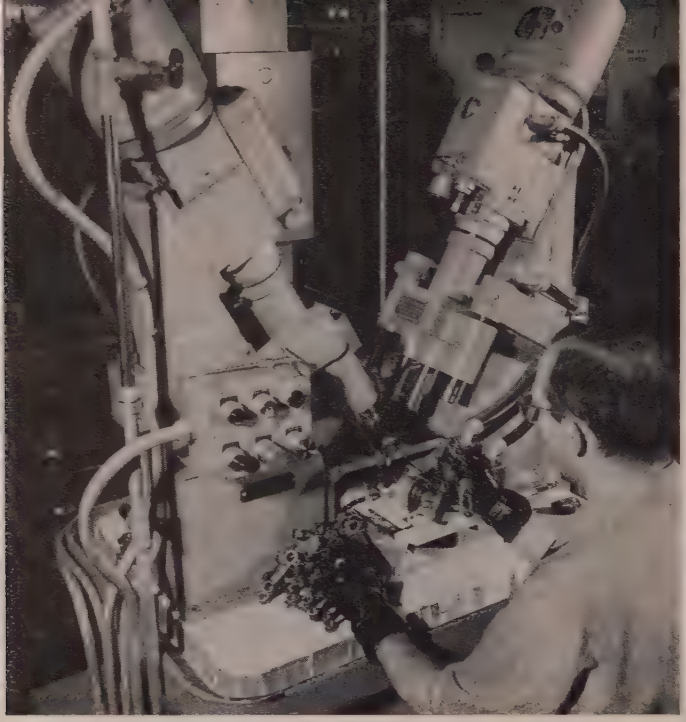
PLATING TIP— For outdoor exposure in industrial atmospheres, there appears to be no satisfactory substitute for heavy nickel plate. This is what Dr. R. B. Saltonstall, Udylite Corp., told the Fourth International Conference on Electrodeposition and Metal Finishing April 22 in London. Substitution of bright copper plate for part of total thickness helps meet requirements of salt spray test and has value in marine or rural atmospheres. Thin nickel over copper has not been too encouraging in industrial areas. Substitutes, such as chromium-plated copper and bright white brass, have given surprisingly good results for interior auto hardware.

NEW ALLOY— High temperature and stress rupture tests conducted by Naval Ordnance Laboratory and NACA on Thermenol, alloy of 80.7 per cent iron, 16 aluminum and 3.3 molybdenum, show it to be equal to or better than some forms of stainless steel. Other properties of the new alloy of interest: Low density, high electrical resistivity, good tensile strength and excellent soft magnetic characteristics.

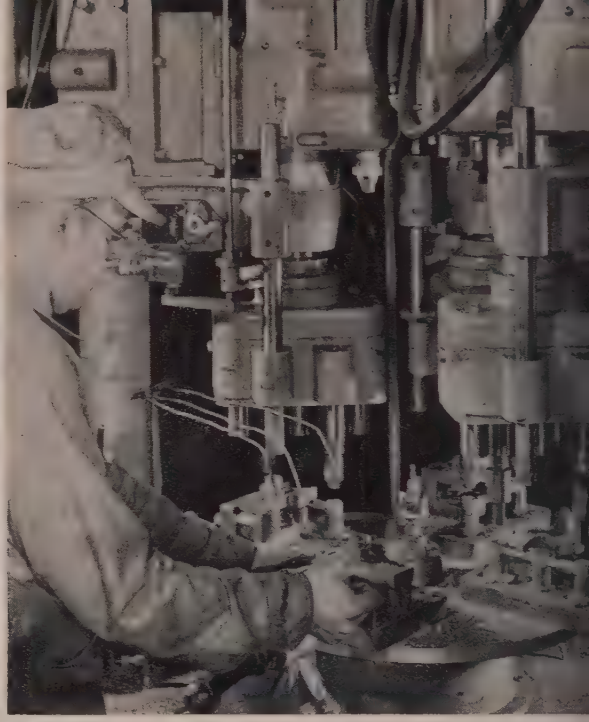
AUTOMATED FORGING— C. F. Hautau, Hautau Engineering Co., Detroit, says that his company is making an automatic loader for horizontal forging machines. Automatic operation will produce ball bearing retaining rings. New loader costs $100,000 and "makes one press do the work of 10, one operator do the work of 30." Unit will produce 20 rings a minute. Installation is said to be about a year away.

EXTRUSION DIES— A predominating cause of short die life in aluminum extrusion is the reworking of dies required by differences in extruding characteristics between casts. This was the opinion of a recent forum at Firth Sterling Inc., Pittsburgh. Group felt increased hardness could not prevent scratching. Aluminum oxide, which does the harm, is extremely hard. They also thought that breakage often occurs because inadequate support is necessitated by shapes being extruded and insufficient hot yield strength of support materials.

Working Outlook—p.47 Market Outlook—p. 141



This single purpose machine designed and built by McCulloch Motors Corp., Los Angeles, incorporates two units, each equipped with 2-spindle drill head for simultaneously centering and drilling lubrication holes on large end of forged steel connecting rods for power chain saws



Milwaukee Flush Valve Co. uses three units, each equipp with 6-spindle multiple heads. Operations include h low milling, drilling, reaming, spot facing, counte boring, facing, countersinking, threading and tappi both left and right. Production is 215 pieces per ho

DESIGN YOUR OWN SPECIAL MACHINE TOOLS

Companies are finding they can buy power units and feeding devices, then put them together cheaper than they can buy special or single-purpose machines

AVAILABILITY of standard, packaged precision drilling and tapping units has spurred a "do it yourself" trend in the metalworking industry, according to Lyman K. Shepard, sales manager of Rockwell Mfg. Co.'s newly established drill unit division. Users are ordering the self-contained, high-speed power units and adapting them to their needs with relatively inexpensive fixtures and mounting facilities.

In this way, a manufacturer can sharply reduce lead time and high costs formerly connected with the outside design and construction of special or single-purpose machines. A setup incorporating the units can usually be quickly retooled and adjusted to perform the same operations on a different part size or be converted inexpensively to entirely different operations.

Customer Demand — Early in 1950, Rockwell's Delta power tool division observed that increasing percentages of its orders were for drill press heads alone. Customers wanted the heads in order to bui them into their own special m chines. The new division was a cordingly formed and tooled u for assembly in the company Pittsburgh plant.

Units are built in three size ranging from a ¾-hp to a 5-h model. Smallest model offers maximum stroke of 1½ inche capacity (mild steel) of 5/16 inc (diameter) drill, feed range of to 70 ipm and rapid traverse ra of 350 ipm. Other two mode have maximum strokes of 4 a

inches respectively, 5/8 and 1 1/8-
ch drills, 0 to 50 and 0 to 180
m feeds, and 240 and 300 ipm
averse rates respectively.

Mount at any Angle—Because
their sealed unit construction,
ie drill units can be mounted
any angle, thus making it easy
handle vertical, horizontal and
gular holes simultaneously.

Built-in limit switches are a
andard feature. Needing no ad-
stment, these switches provide
ie basic electrical elements for
ll electrical remote control, mak-
g it a relatively simple matter
electrically interlock the units
ith index tables or automatic
orkholding devices.

An additional feature which
elps take the word "special" out
the single-purpose machine field
the fact that the rate of feed,
stance of rapid traverse and
nal depth are completely adjust-
ble. A wide range of spindle
eeds is made available by vari-
is standardized drives.

Operating Adjustments — The
pid-approach portion of the
roke can be controlled from zero
full stroke of the unit by turn-
g a threaded rod the approxi-
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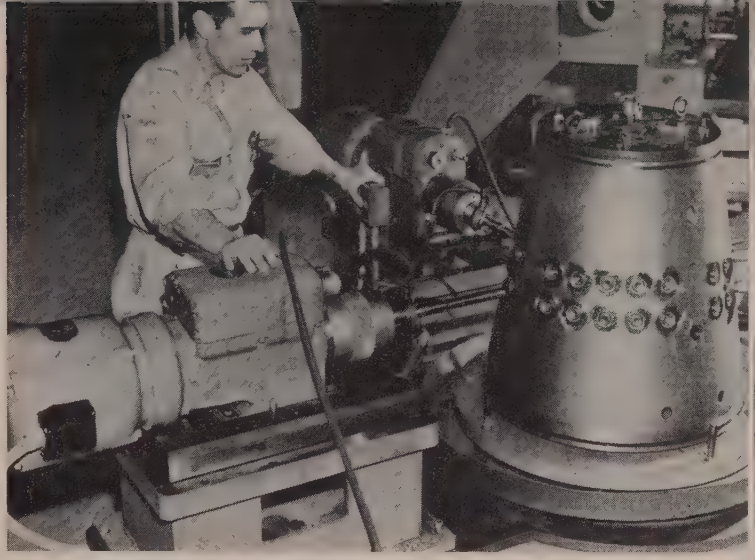
ck nut makes this adjustment
mper-proof. Hydraulic feed
te, infinitely variable within its
nge, is controlled by a graduat-
feed control knob which also
n be locked to prevent tamper-
g.

A gear-train-operated stop nut
ncentric around the quill con-
ols the spindle travel or final
pth. This arrangement pro-
des micrometer depth adjustment
an absolute, positive depth
roughout the drill's stroke.
epth can be adjusted within
ousandths of an inch and the
it will repeat depth to within
0005 inch.

Production Problem—Mass pro-
uction of a precision-built pow-
unit posed some interesting
roblems for the new division. For
xample, base and keyway had
be absolutely parallel to the
ie of action of the spindle car-
er.

Rockwell, in one pass of a
rge broach, shaves the base and
ts the dovetail ways and the
eyways, thus insuring the neces-
ry parallelism.

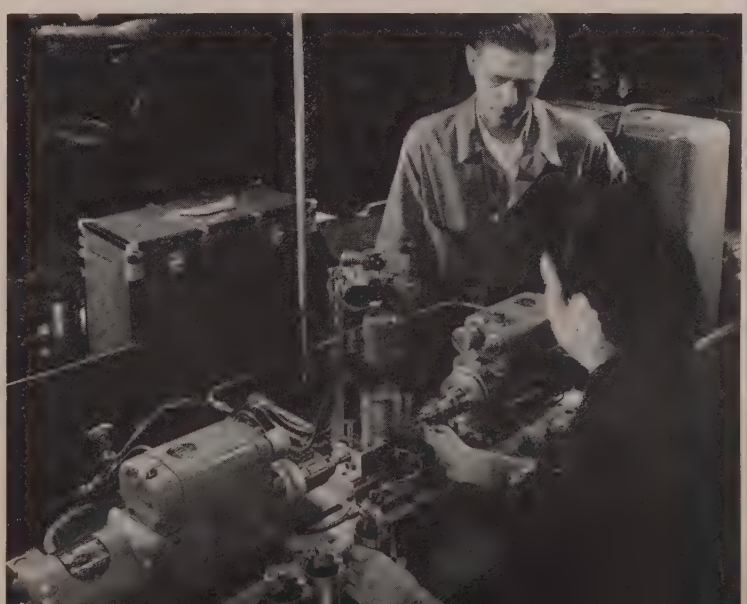


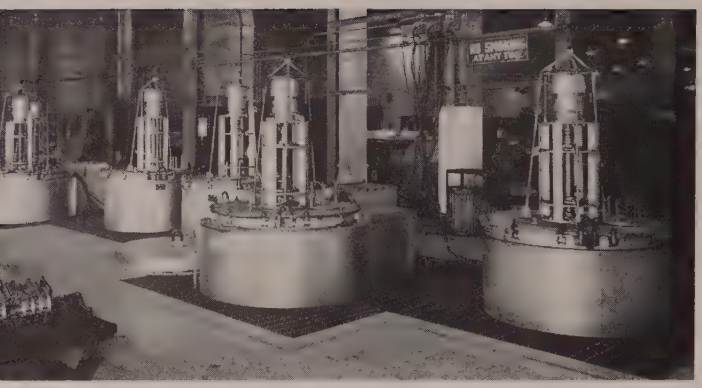
This unitized tool incorporating two units has simplified boring of exhaust cones for jet engines at Solar Aircraft Co., San Diego. Two units are set 90 degrees apart, pointed to rotary table which is full indexing. Machine is faster than the radial drill it replaces

To insure spindle accuracy, a pre-loading technique is employed. Major difference between standard grade and precision grade ball bearings lies in the amount of radial play between inner race, balls and outer race. Rockwell uses standard bearings but eliminates the difference by measuring axial play with a dial indicator and then facing the proper length spacing tubes for placement between inner and outer races, eliminating that play. This produces what amounts to a precision bearing.

Additional precision is imparted by finish-boring spindle noses while they are turning within their own pre-loaded bearing assembly, thus making the mass-produced spindle's minimum run-out not exceeding 0.001 inch, total indicator reading.

Portable Electric Tools Inc., Chicago, reduces costs 25 per cent with this shop-designed machine. Among other things, it bores two brush holder holes in the portable drill body. Holes are then used for locating the part during all other machining operations on the castings





Installation of Lindberg nitriding furnaces and cooling pits for aircraft engine parts

Number 2 in STEEL's

MODERN HEAT TREATING SERIES

By NORBERT K. KOEBEL
Drector of Research
Lindberg Engineering Co.
Chicago

Fundamentals Of Heat Treatment—Part II

Alloying Agents Add Tailored Properties

IN HEAT TREATING steel, the role of carbon is modified by the presence of alloying elements.

Alloying agents, such as chromium, nickel, molybdenum, tungsten and vanadium, change the critical temperature of steel with reference to a given carbon content. They also call for different quenches—from brine to water, oil or air.

Reminder—Part I (STEEL, May 17) described carbon as the chief hardening element. That holds true for thin sections that quench out rapidly. If alloy is added, hardness does not increase.

What happens with heavier sections of plain carbon steel? Take 0.45 per cent plain carbon steel in bars ranging from ½-inch in diameter upward.

Proof—After they are quenched, make Rockwell C hardness readings (starting at the edge) every 1/16-inch across the diameter. Plot readings on a chart, with hardness as abscissa and distance from center line of each bar as ordinate. A U-shape curve (Fig. 1) will be obtained.

Hardness varies as the cross section increases. Also, the surface hardness decreases as the diameter of the bar increases.

Size of the bar slows down the speed of the quench so that only part of the bar gets a chance to transform to hard martensite. Remainder of the bar cools at a slower rate. Carbon separates out as soft pearlite.

Point of using alloying elements is brought out with the same 0.45 per cent carbon steel containing 0.92 per cent chromium and 0.16 per cent vanadium. Perform the same tests and plot hardness values (Fig. 2).

The alloy causes the steel to harden much deeper. The significance is that only a small amount of alloying elements is needed to get higher hardenability. Carbon content is not changed and the same quench is used.

Quenching—Medium used also plays a part in rate of heat removed. For example, quench the two steels (Fig. 1 and 2) in oil instead of water. Decreased hardening shows up in Fig. 3 and 4.

Increasing carbon content also increases depth of hardening. In most cases this is not sufficient to meet engineering specifications. Alloying elements are still required.

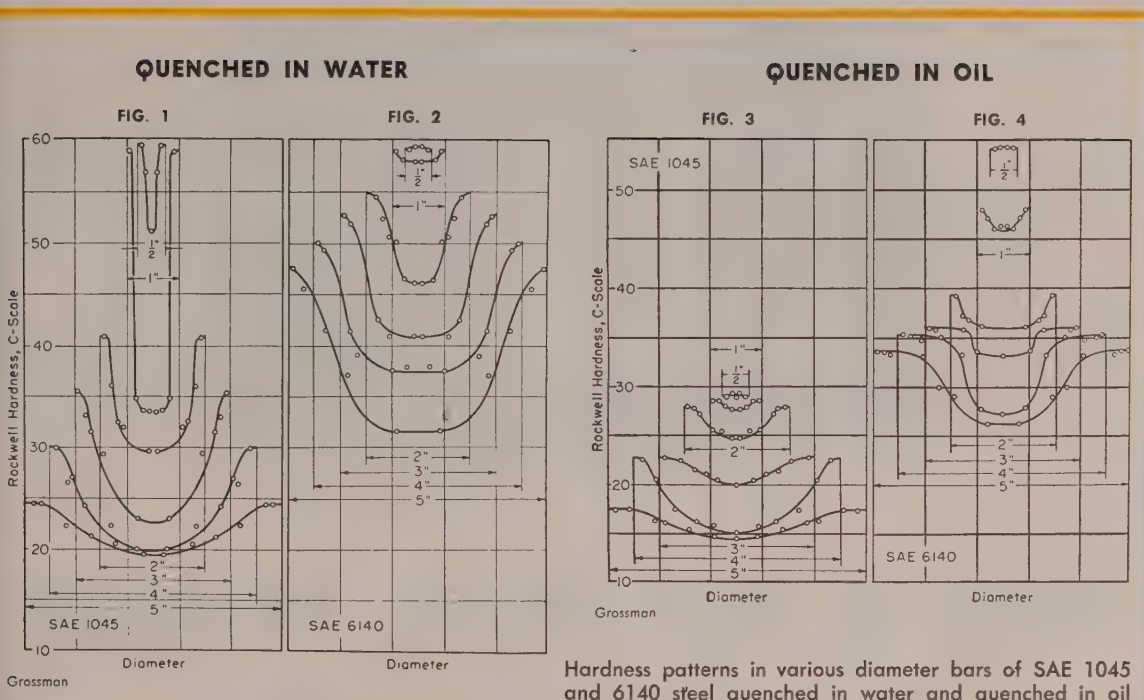
More Value—There is another reason why alloying elements are needed. Even if proper hardening depth could be obtained with carbon steel, many parts cannot survive a drastic quench such as brine or water. Distortion is too great.

To control distortion, alloy steels of different carbon levels are used. They harden to the specified depth by oil quenching or even air cooling.

High Alloys—Many tool steel compositions have the proper balance of alloying elements to make them nondeforming in hardening and yet retain hardness and wear resistance.

Tool steels usually have a high alloy content—to increase hardenability, wear resistance, toughness, impact or yield strength; make the

Subsequent articles in STEEL's Modern Heat Treating Series will take up specific applications of carburizing, nitriding and carbonitriding. Next article in the series (No. 3) on June 7 will discuss quenching.



Hardness patterns in various diameter bars of SAE 1045 and 6140 steel quenched in water and quenched in oil

eel safer to harden by using a ss drastic quench or nondeform- g on hardening; or give high rdness and keen cutting edge en at dull red heat.

Types include: Shallow water rdening, nondeforming and hard- ing, nondeforming air hardening, pact or chisel hot work and high eed cutting steels.

Adds Elements—Three import- t types of heat treatment alter e chemical composition of the eel during treatment: Carburiz- g, nitriding, and carbonitriding. In carburizing, carbon is added the surface of low-carbon steel make it respond to hardening. hen a low-carbon steel is packed to a carburizing compound of arcoal and other chemicals, seal- in a closed container and heated 1700° F, carbon from the char- al goes into surface of steel.

Depth of penetration depends on e time parts are held at temper- ure. About 0.010-inch per hour standard for the first 0.050-inch. ver 0.050-inch, the process slows wn.

Many parts (gears, for example) e carburized to get a hard wear- g surface with a tough, ductile re. After the parts are car- burized, they are hardened and tempered in the regular way.

Uses Gas—In the more modern method, gas carburizing, parts are placed in an atmosphere furnace with a carburizing gas. Atmosphere is made up of a carrier gas, such as produced by an endothermic atmosphere generator—with natural gas added to increase the carburizing power.

Gas method has advantage of faster carburizing by eliminating heavy pots and charcoal charge. Parts can be quenched direct from the carburizing furnace, since there is no charcoal separation involved.

Adds Nitrogen — Another gas treatment, nitriding, adds nitrogen to steel to give a thin but extremely hard surface. Special steels are required. They contain alloying metals, such as chromium and aluminum.

Nitriding is carried out between 950 to 1050° F in an ammonia gas atmosphere. The ammonia cracks on the surface of the steel giving nitrogen and hydrogen. Nitrogen gas in this atomic form is dissolved by the steel. Actually, the nitrogen combines chemically with iron to produce iron nitride. It is much harder than martensite, the constituent of regularly hardened steel.

Nitriding is a slow, costly process. A 0.020-inch case, for instance, requires a 60-hour treatment. But quenching is not required. Distortion is minimized. Nitriding is used on parts that require a hard, wear resistant surface, where distortion must be held to a minimum.

Adds Both—Carbonitriding adds carbon and nitrogen to the surface of steel. Temperature range is usually 1450 to 1550° F. Ammonia gas is added to the same gases used for carburizing. Chemical composition of the case produced at 1450 to 1500° F is the same as that produced by heat treatment in molten cyanide baths.

Chief application for carbonitriding is light and medium cases from 0.001 to 0.025-inch. Straight carburizing is used for all heavy case work, in excess of 0.025-inch. Parts are usually oil quenched directly from the furnace without contacting air. Work remains free from scale. Manufacturers look on modern carbonitriding as about the most inexpensive method of getting a wear-resistant surface on cheap steel.

A commercially-pure grade, A-70, is being forged here. Ease of hot work has contributed to growth of industry

How to Hot Work Titanium

Metal can be rolled, hammered, pressed or extruded from ingots into blooms, billets or slabs; then worked by same methods into plate, sheet, strip, bars, rods, forgings, etc.

By C. I. BRADFORD
Vice President and Director of Operations
Rem-Cru Titanium Inc.
Midland, Pa.

ABILITY of titanium to be hot worked with conventional steel mill equipment has been largely responsible for the rapid growth of the industry.

The metal can be rolled, hammered, pressed or extruded from ingots to blooms, billets or slabs; and then worked by these same methods into plate, sheet, strip, bars, rods, forgings, tubes and special shapes.

The rules are simple, and the tricks are readily understood by those skilled in the art of metalworking. No matter what method of hot working is used, good heating practices are desirable. As might be expected, the metallurgist is faced by compromises.

Furnaces and Atmospheres — Titanium absorbs hydrogen above 300, oxygen above 1300 and nitrogen above 1500° F. Degree of contamination is a function of time and temperature; all three contaminants cause the formation of a brittle surface layer. To minimize hydrogen pick-up, Rem-Cru recommends avoiding reducing atmospheres containing hydrocarbons and free hydrogen.

> This is the third in a series of five articles on titanium by Mr. Bradford. First, May 10, covered useful properties and availability; second, May 17, dealt with grinding. Remaining in the series: Heat Treatment and Metallography and Forming.

After hydrogen, control of oxygen and nitrogen absorption is next on the list. Nitrogen is less active than oxygen. When the metal is heated in air, no nitrogen is found in the scale. This indicates preferential affinity for oxygen in the presence of nitrogen.

Rate of sealing is not rapid at about 1500 to 1700° F, the normal, hot-working temperature. To insure freedom from hydrogen pick-up and a clean forging with a minimum of scale, a reasonably oxidizing atmosphere is recommended.

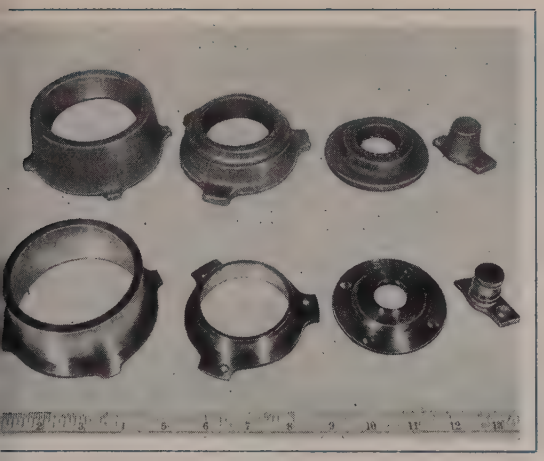
Titanium absorbs iron and the usual semi-liquid mixture of oxides found on hearths of most production furnaces. Billets or pieces to be hot-worked should be placed on clean bricks, rails, etc. This critical detail is often overlooked.

Heating Equipment — Contaminants should be kept in mind in the use of conventional open-fired or semi-muffle equipment.

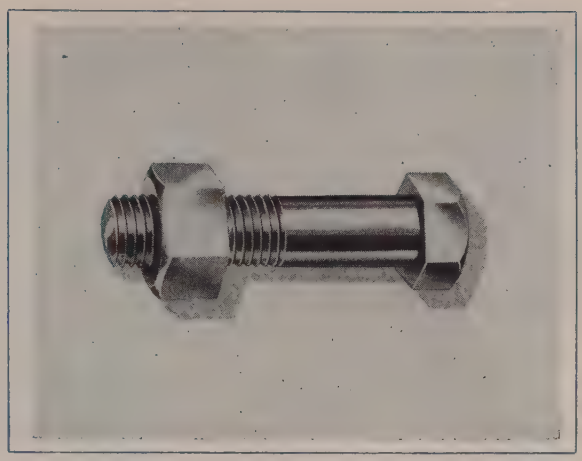
For small parts, such as hot heading bolts or initial forging operations on turbine blades, induction heating can be used with considerable success. Atmosphere control is not needed because time to temperature is short.

Resistance heating takes advantage of the metal's low electrical conductivity. Advantages are the same as in induction heating.

Salt baths also afford rapid heating without exposure to air or carbon. Houghton's Liquid Heat 1145



se forged and machined aircraft parts are readily de from A-70 and C130AM. Equipment used is standard



Pawtucket Mfg. Co., Pawtucket, R. I., produces bolts with smooth, hot-forged heads. Material used is the C130AM

s been reported satisfactory up 1600° F. A mixture of 90 per nt $BaCl_2$ — 10 per cent NaCl o has been used with some suc- s. Pitting is reduced when LiCl added (Rem-Cru Patent 2,554,- 2).

Temperature—Grades A-55 and 70 should be heated to about 50° F, at which point they are sily worked without danger of ain coarsening. Finishing tem- ratures of 1300 to 1400° F are rmal.

Reheating during forging is per- ssible, but it should be carried early enough to provide a rea- nable amount of metal flow after al heating. It is better to forge f-way, reheat and finish—even ough temperature before reheat- is only 1550° F. This practice es finer grain size and improved perties.

C-130AM is a forging alloy. ual starting temperature for ssive forgings is 1750° F, with al reheating at 1600-1650° F. r small, thin parts, such as com- ssor blades, a starting tempera- e of about 1600 to 1650° F is quently used. Heavy equipment uld be used to keep reheats to inimum.

A finishing temperature of about 50 to 1550° F is recommended. wer temperatures may result in ne hardening and a slight de- ase in ductility.

Heating Time—You should allow thorough heat penetration and p at that point. Soaking at perature in a conventional fur- e results in increased absorption of oxygen and a tendency toward grain coarsening.

Of course, specific heating times cannot be recommended due to furnace variations. But it is helpful to remember that titanium has about the thermal conductivity of 18-8 stainless, and that the piece should be worked as soon as it is heated uniformly throughout the cross-section. Occasional rolling or turning of large pieces will help increase rate and uniformity of heat absorption.

While it is not absolutely necessary, good practice for semi-muffle and open-fired furnaces includes a preheat.

Cooling Rates—Rem-Cru grades, such as A-55, A-70 and C-130AM are designed to avoid phase change that would cause thermal hardening during cooling. Still air is ordinarily used.

Annealing, Stress Relief—Neither A-55 nor A-70 undergo phase change during cooling. Since solution treatment is not required to improve properties, post-forging thermal treatments should be unnecessary. However, in most cases an annealing or stress relieving treatment is recommended. This will provide a more uniform product—free from cooling strains and with maximum ductility.

Stress-relieving is a function of time and temperature. The operation is quite flexible. A-55 and A-70 can be fully stress relieved in about 1 hour at 1100 to 1200° F, C-130AM in 1 hour at 1300° F, followed by air cooling. C-110M can be largely stress relieved by 1 hour at 1050° F. 1300° F will completely anneal it, but it then should not be cooled faster than 5 degrees a minute to 1050° F, at which point it can be cooled in air.

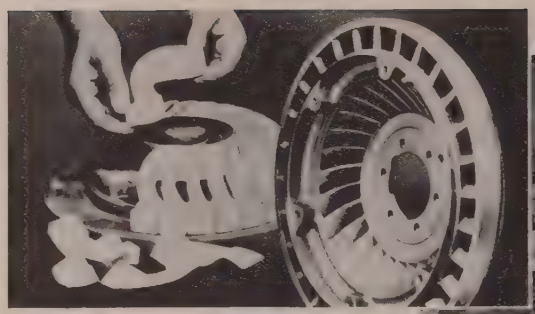
Equipment — Material can be worked on rolling mills, hammers, presses, etc., like steel and other metals. Power requirements are above those for steel because of the metal's compressive strength in hot working. Metal also resists sudden deformation. More can be done by slowly applying pressures.

Kinetic energy absorbed by the material may increase temperature; so care must be used to avoid localized overheating and grain coarsening.

Surface Conditioning — Resistance to cracking during forging is one of titanium's outstanding features. Surface defects in steel and other materials that would progress into deep cracks with a few blows of the hammer do not seem to have the same effect on the metal—and C-130AM in particular. Explanation may be relative notch insensitivity at elevated temperatures.

If laps or surface cracks appear, they can be removed by chipping or grinding. Best results seem to be obtained if it is done while the metal is still warm.

Shrinkage—Titanium has a relatively low coefficient of thermal expansion. It shrinks much less than aluminum or austenitic stainless during cooling from the hot-working temperature. This must be considered in die design and tolerances of closed die forgings and bars rolled in fixed mill grooves.



One of first applications of plaster process was casting of intricate bladed parts in automotive torque converters. Plaster cores in photo above form blades on the casting

PLASTER CASTING

New Tool for Aluminum Parts Production

The technique has a history, but it's one of limitations. Alcoa's process promises volume production of small castings, profitable application on components

PERFECTION of the plaster casting process by Aluminum Co. of America adds an important new production method to the company's five foundries. The plaster process was first developed on a large scale by Alcoa as a core material for bladed castings used in automotive torque converters. According to A. B. Norton, general manager of the Casting Division, the process is now employed on a variety of foundry applications.

Expanded facilities necessary to use the new process are nearing completion. Additions have been made to the Detroit and Cleveland works. New capacity has been completed at plants in Vernon, Calif., Buffalo, N. Y., and Bridgeport, Conn.

Typical applications of plaster process are seen in this assortment of parts. Size can be gaged by 2-inch-high Alcoa shield in foreground

Design Possibilities — The company reports its plaster process extends design possibilities for aluminum and magnesium castings to allow production of parts in the foundry that formerly were considered impossible to produce.

Use of plaster of paris for casting aluminum dates back about as far as aluminum itself. But its application has been limited by such factors as time and cost. Effect of Alcoa's permeable plaster process is to reduce this process time and hold down cost.

Permeable plaster molds allow casting of aluminum parts with thin cross sections and excellent surface smoothness. In addition, accurate dimensional tolerances can be met. Physical properties that can be achieved with permeable plaster equal in most cases those provided by aluminum sand castings.

Parts Range—Plaster mold components, already in extensive production for torque converter parts, offer other promising applicatio for volume output of small cas ings. Some examples are sma bearings and building hardwa parts.

But the process is not limited small parts. Plaster mold comp nents have been used with sand permanent mold materials to pr duce a composite mold casting. Th plaster used in this combination a lows the designer to specify su face and dimensional accuracy on where it is needed. Optimum a plication of the various mold mat rials will improve strength and o ten result in lower equipment an casting cost.

Tolerances — While the plast process will not match fine m chining tolerances, it is sufficient accurate to avoid the machinin that is often required with sand permanent mold.

General tolerances possible a ±0.010 inch across the parting li for one inch or less. Between poin produced in one part of the mol ±0.005 inch tolerance is possibl A nominal surface finish of 12 rms or better can be achieve Where necessary, sharp corne can be cast.

See How FORGINGS CAN SAVE MONEY

(Below) This forged brass part was originally made from a casting and a tube, silver soldered, as indicated in the drawing. Forgings can save a lot of money!

(Above) Brass part as now forged in one piece. Drawing shows how it was originally made in three pieces, two made of tube and the other from sheet, silver soldered.

Photos of forgings shown are approximately 3 times larger than actual size.

The two brass parts shown here were originally built up out of separate pieces, silver soldered together. That was the difficult and expensive way. Then the manufacturer and Revere worked together to see if forgings could not be used. Designs and dies were worked out, and for a number of years Revere has kept a steady flow of these parts going to the customer. He reports that the forgings not only save money, but are superior: stronger, more dense, with a better finish, and machining is faster and easier.

If you have sub-assemblies made of several parts, look into forgings. They may offer important economies. Revere makes forgings in copper and its alloys, and aluminum alloys. See the nearest Revere Sales Office.

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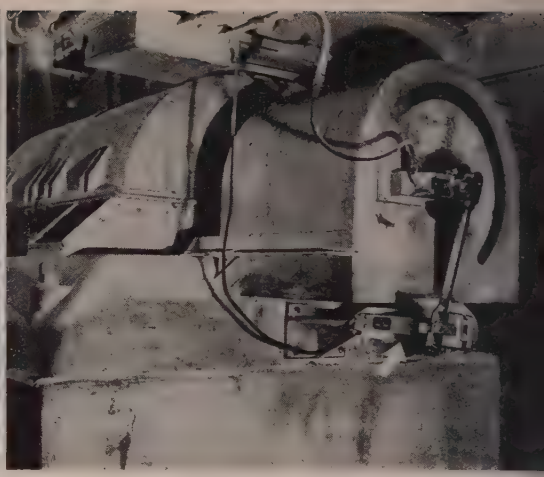
SEE "MEET THE PRESS" ON NBC TELEVISION, SUNDAYS

This 70,000-pound steel casting was weighed by the three tiny cylinders (the load cells) behind bench



Arrow shows load beam that automatically controls dewatering of polyvinyl chloride resin powders

Measuring with Electrons

Load cells are being used to measure weight and force. Applications include automatic control of industrial processes, batch weighing and machine operations

IS THERE an easy way to weigh a 70,000-pound steel casting?

One company took this shortcut: Instead of going through the fuss an expense of hauling the mountain of metal several miles on a freight car to a scale, it rigged a makeshift scale of its own at the plant (photo above).

The traveling crane picked up the casting, the three load cells (foreground) were slipped under it and the casting was lowered on them. The portable, laboratory-type strain indicator (on bench) converted strain units into pounds. Variation of this is to put a loading platform on top of the load cells. Weight of the platform can be zeroed out on the instrument.

Pounds to Psi—SR-4 load cells, product of Baldwin-Lima-Hamilton Corp., Philadelphia, are being used to measure weight and force.

Combined with electronic instruments, they become electronic scales—conventional types include platform, track, crane, conveyor and tank (STEEL, p. 110, Aug. 17, 1953).

They're also finding application in the automatic control of industrial processes, batch weighing and machine operations.

Here's How—You can stretch or compress a piece of steel with your bare hands. Bond a wire to the metal and you can measure that force or weight (small or large) in terms of voltage—electrical conductivity of the wire is changed when it's stressed. This, in short, is the secret of the load cell.

Strain gages (think of them as the wire) are bonded to the steel, load-bearing column of the load cell. Weight or force on the column is converted into electrical output by the strain gages; tubes amplify the signal; and, finally, instruments translate this information into weight or psi.

BLH offers load cells in 24 standard sizes, ranging from 0 to 50 to 0 to 200,000 pounds. Cell of 5000-pounds capacity is 4 inches in diameter, 5¼ inches tall and

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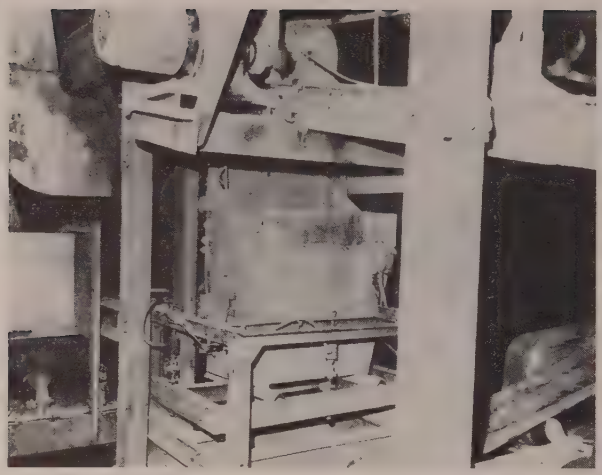
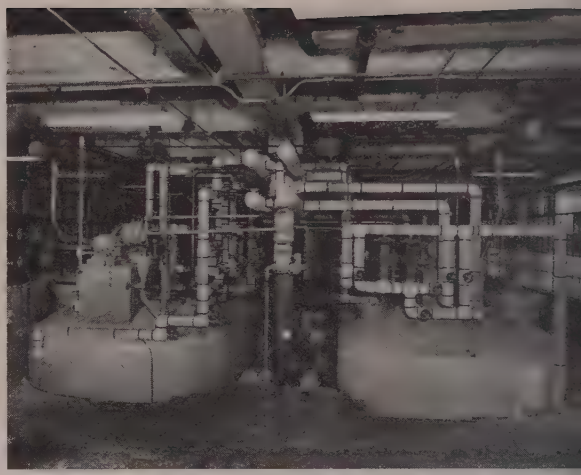


Load cells automatically control the weighing of different mold sands going into this skip bucket



Load cell under each churn gages amount of materia in them. It also controls ingredients being adde

weighs four and a half pounds.

Automatic Control — General Steel Castings Corp., Granite City, Ill., uses load cells to get predetermined proportions of mold sand (up to three types) in its foundry. Each skip bucket rests on a steel platform suspended from three, 2000-pound load cells.

Weight accuracy is said to be close to 1 per cent on an 1800-pound batch—including effects of moisture content, height of sand in bin and cleanliness of the conveyor that feeds sand into the weighed hopper. Cells themselves are accurate to within ¼ per cent.

Operation—Say two kinds of sand are needed. Control dials on the instrument panel board are set for quantities of sand to be fed by vibrators at the sand bins into a conveyor belt. When the starter button is pushed, the first sand is delivered into a bucket, second sand is delivered automatically. Finally, a signal light tells the operator that the bucket can be raised.

Three interlocking switches assure proper operation. One prevents start of the filling cycle until the bucket is in place. Another prevents starting if more than 30 pounds of sand remains in the bucket from the previous mix. The third prevents hoisting the skip bucket if the sand supply in any bin is not enough for the mix. Other devices protect the load cells against impact overloads.

Using this procedure, a batch was made up every two minutes, 24 hours a day. Recently, the entire cycle was made fully automatic. Production was further increased and greater precision was afforded in controlling quality of mold sands.

Compactness of load cells is a distinct advantage in this installation. Other obvious benefits are that they have no moving parts, are fully enclosed and sealed so that sand and dust cannot affect the operation. Indicating and controlling instruments are also dust proof and can be placed at the weighing point or a remote spot.

Force—A major steel company uses load cells on tandem rolling mills to get close control on thickness uniformity of sheet and strip steel, adjustment of rolling loads while the mill is running and better distribution of loads among the rolls.

Similar results are obtained on mills for rolling aluminum sheet in another plant.

A paper manufacturer uses load cells in paper making machines as an accurate way of controlling the squeezing out of water in the dryer section by assuring constant and uniform pressure across rolls.

Machines — Another type SR- device, a cantilever load beam, i used in applications of the Bir industrial centrifuge—where, fo example, wash waters are remove from granular coal or polyviny chloride resin powders.

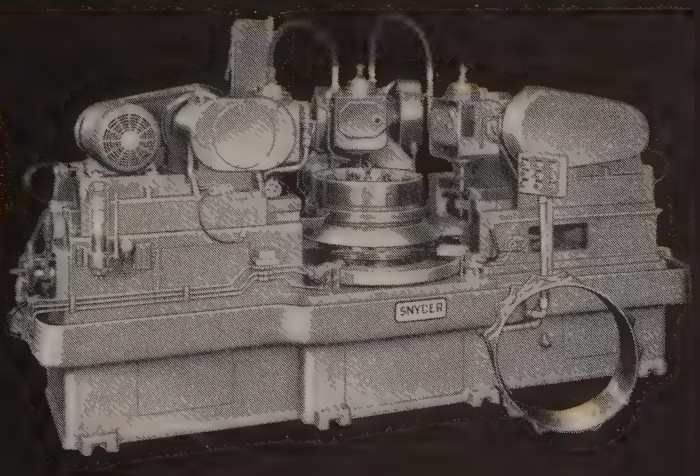
Device is used to detect over loads, give warning signals, pro vide for continuous records of th load, stop the machine and auto matically regulate feed.

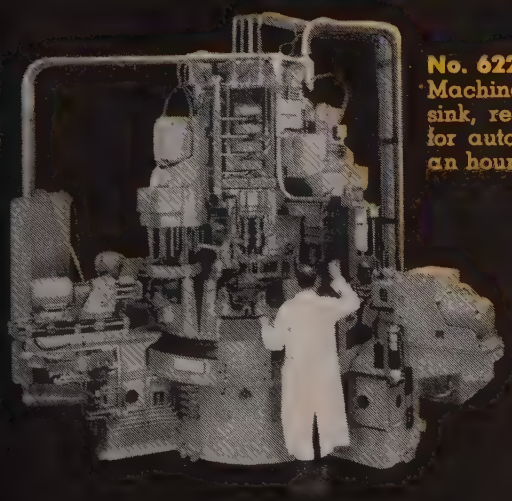
Conventional—One of the mor interesting conventional uses o the load cell is the gaging of th amount of material in a tank o the proportioning of materials.

In this type of weighing it ma be practical to use a single loa cell at one of three points of sup port of a leveled tank—liquids dis tribute their weight proportionate ly at all levels. U. S. Rubber Co plant at Woonsocket, R. I., uses this principle to weigh raw ma terials for foam rubber product in eight, 200-gallon latex churns.

A single indicator, connected through an 8-point switching unit is calibrated to give direct weight readings of each churn's contents Combined with the indicator is a controller that can be set to shut off fill lines at any weight. Load cells also operate limit switches in alarm circuits. They guard against over-filling and indicate when the tank is nearly empty.

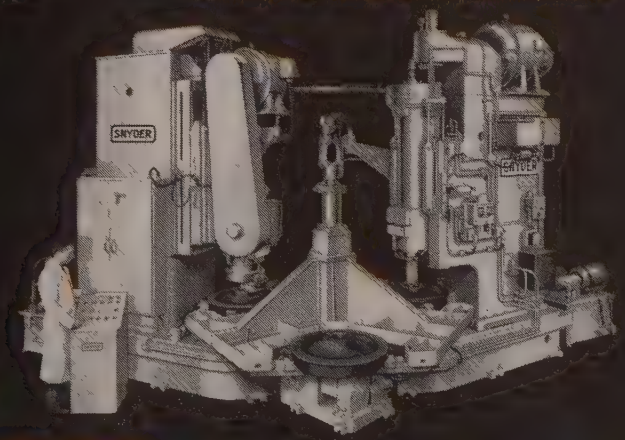
No. 68326—A three-way machine to profile mill four rows of lugs on a compressor casing for jet engines. 135 minutes are used to perform this operation in 3 steps.





No. 62207—Six Station Center Column Machine to drill, counterbore, countersink, ream and tap converter housing for automatic transmissions. 91 pieces an hour at 80% efficiency.

No. 67677—Two-Station, Vertical Column, Boring and Facing Machine to rough bore and face the hub of heavy railroad car wheels. Bore 6¼" x 7" long. 33 units an hour at 100% efficiency.



SPECIALS by SNYDER

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24 Places to Save with Alloy Steels

	Corrosion	Fabrication	Strength	Toughness	Wear
1. Anchor chain		●	●		
2. Annealing retorts	●		■		
3. Band saws					■
4. Bolts	●		●	●	
5. Bumpers for autos		●	●		
6. Clutch springs		●	●		
7. Collapsible boxes			■		
8. Equipment in contact with hydrogen	●	●	●		
9. Fencing	●		●		
10. Hand shovels				●	●
11. Hot-water tanks	●	●	●		
12. Industrial roofs	●				
13. Industrial screens	●		●		●
14. Overhead traveling cranes			■		
15. Pole line hardware	●				
16. Power shovels	●		●	●	●
17. Pressure vessels	●	●	●		
18. Rivet sets					■
19. Steel-mill equipment			●	●	●
20. Striking dies		●		●	
21. Transformer shells	●		■		
22. Truck and trailer bodies and frames	●	●	●		
23. Horseshoe calks				●	●
24. Fire extinguishers	●	●	●		

Adapted from the book *Alloy Steels Pay Off*, a publication of the Climax Molybdenum Co., New York.

ANCHOR CHAINS— Welding mild steel in this application is slow and costly; strength-weight ratio is low. **SUGGESTION**—Di-Lok process, developed at Boston Navy Yard, forms several hundred links a day per crew with heavy, drop-forge hammers. Size for size and weight for weight, chain is said to be twice as strong as best wrought-iron type. Only alloy steel is used, such as AISI-SAE 1330, 8627 and 2330. Stainless and austenitic manganese may be used for specials.

ANNEALING RETORTS—When used up to 1650° F for 30 hours, wrought, carbon-steel retorts are subject to scaling. Service life may be limited **SUGGESTION**— Electro-Alloys Division of American Brake Shoe Co., makes centrifugally-cast tubes of heat-resistant alloy steel (about 25 Cr, 12 Ni). After 14,000-cycle hours, they are reported to be in perfect condition—no measurable scale loss, with wall thickness and shape unchanged.

BAND SAWS — Carbon-steel (about 1.25 C) band-saw blades are not highly successful as cut-off saws for materials that have difficult machining properties.

SUGGESTION—Henry G. Thompson & Son Co. has a high-speed-steel blade for cutting stainless and other materials on a production basis. Cutting life is said to be lengthened, time per cut is shorter and more consistent. Of course, proper band saw machines must be used to get these results.

BOLTS — When heat treated, their yield strength depends mainly on degree of through hardening, which limits carbon steel types to small sections up to about ½-inch diameter. Material also is limited much below or above room temperature and in highly corrosive media.

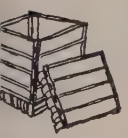
SUGGESTION—Try alloy steels for high-strength bolts at room temperature, at low temperature where embrittlement is a factor or at elevated temperatures where creep strength is important.

BUMPERS—For passenger cars, materials must combine ease of fabrication plus strength. Designs complicate former.

GGESTION—Many bumpers are made with high-ength, low-alloy steel (SAE 950), with minimum ld point of 50,000 psi. It can be cold formed, king the polishing operation relatively cheap since is done automatically on unformed flat sections. vings are result of simple processing procedures d fewer rejects.

CLUTCH SPRINGS—One type using AISI-SAE 1065 brought up a spring-property problem: High carbon combined with cross rolling caused de-rb. So plate was made oversize. Decarb was ground . Also, cracking was a forming problem.

IGGESTION—A large automaker uses low-carbon AE 950. Grinding is eliminated. Cold forming prop-ties are good without any anneal. Formed spring carburized to up original carbon content to a uni-rm 0.4 to 0.5 per cent.



COLLAPSIBLE BOXES—Ideal here is strength at no sacrifice in weight. Latter goes to economy of shipping.

SUGGESTION—Equipment Mfg. Inc. ses corrugated side and bottom panels and a tubular ame. They replaced 10-gage, corrugated, carbon-eel sheet with 13-gage corrugated, high-strength, w-alloy steel. Tubular members are still made of ild steel. Box that did weigh 385 pounds has been immed down to 298 pounds.

SPECIAL EQUIPMENT—Processing in hydrogen at elevated temperatures and/or pressures damages carbon steel.

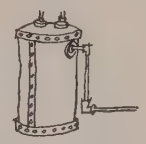
UGGESTION—Trend has been toward use of chromi-m-molybdenum-vanadium or chromium-molybdenum-ngsten-vanadium steels with about 3 per cent romium for solid-forged vessels. Same grades or ainless steel are being used as inner, hydrogen-sistant layer in multilayer composites.

FENCING—Maintenance is the big item here, particularly in industrial areas and near the sea coast.

SUGGESTION—A large power com-any uses stainless-steel, chain-link fencing for all stallations. For example, 13-gage stainless (type 02) has replaced 9-gage, galvanized carbon steel. igher first cost of stainless is offset over the long ll by lower repair, maintenance and replacement sts.

HAND SHOVELS—Shovels are generally made of AISI-SAE 1050 steel, quenched and tempered to about Rc 42. Higher hardness can result in breakage instead of better wear resistance. Different dimensions change balance.

SUGGESTION—Wood Shovel and Tool Co. uses an alloy steel containing about 0.45 per cent C, 0.6 Mn and 0.8 Mo, oil quenched and tempered at Rc 48. Edge remains sharp and does not turn up during use.



HOT-WATER TANKS—Corrosion of the shell can reduce service life and efficiency.

SUGGESTION—Cemline Corp. once used a special cement lining where water supplies were unusually corrosive. Shell was carbon steel. It solved weight, supply and corrosion problems by going to high-strength, low-alloy steel. Tanks well within the safety limit are made with a 40 per cent lighter gage.

INDUSTRIAL ROOFS—They may corrode inside and out.

SUGGESTION—Roof on a furnace building included corrugated sheets of type 410 stainless and galvanized steel sheets. Twenty-five years later, inspection showed practically no corrosion on the outside of the stainless; inside had a light layer of rust, some minor pitting near lapped joints. Other material, though three times thicker at start, was completely corroded through at laps and needed patching.

INDUSTRIAL SCREENS—Factors to consider include corrosion, severe abrasion and extensive cleaning after shutdowns.

SUGGESTION—Stainless gives good service. For most coal-preparation applications, type 410 or 430 is satisfactory. Type 302 is needed where corrosive conditions are extreme. Big advantage is that material stays smooth even during intermittent operation. Strength and erosion resistance make possible the use of thinner and lighter screen plates.

OVERHEAD TRAVELING CRANES—Hardenability of AISI-SAE 1040 may be inadequate to give strength needed for peak torsional stress on trolley drive shafts. Bolts of same material may not have sufficient shear strength.

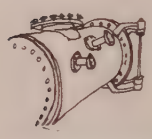
SUGGESTION—Morgan Engineering Co. increased strength of shafts with AISI-SAE 4340 and bolts with AISI-SAE 8640. Forging and normalizing costs are about same for carbon and alloy grades used. Alloys cost a little more to machine.

POLE-LINE HARDWARE — Life of wood poles has been increased, but hardware on electric-light and power-line poles, such as bolts, braces, guy clips, insulator pins, may corrode in industrial atmospheres or near the sea coast.

SUGGESTION—Most economical solution to maintenance costs has been found to be galvanized, high-strength, low-alloy steel. Indications are that hardware will have long life even after the coating wears away, leaving the base material.

POWER SHOVELS — Perhaps the most important need is a high strength-weight ratio in the front end of the shovel. Raising strength of carbon steel by increasing carbon content decreases weldability.

SUGGESTION—Large pay-load, reliability and ruggedness of modern power shovels are the result of the proper application of high-strength, low-alloy and stainless steels. Another advantage: Low-temperature service.



PRESSURE VESSELS — Choice of carbon or alloy steels will turn on such factors as temperature, pressure, corrosion.

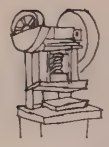
SUGGESTION — Reaction chamber by Babcock and Wilcox Co. offers example of saving with alloy steels. For use at 917° F and 350 psi, thickness needed for carbon-molybdenum steel with 0.5 per cent Mo was 1 13/16 inch. Carbon steel required an appreciably heavier section. Comparative weights: Carbon steel, 173,000 pounds; 0.5 Mo steel, 115,000 pounds.

RIVET SETS —Steel for hot rivet sets must resist shock and softening on contact with hot rivets.

SUGGESTION — A chromium-molybdenum tool steel with about 0.5 per cent C, 3.2 Cr and 1.4 Mo has proved superior to carbon tool steel here. Expected life is said to be from 20 to 50 times greater than the carbon types. In one case, it was reported a chrome-moly steel drove over 27 times more rivets than carbon sets.

STEEL MILL EQUIPMENT —Ruggedness and wear resistance are needed for long life.

SUGGESTION — Examples: Republic Steel Corp. uses an alloy, high-strength steel containing copper, molybdenum and nickel (minimum yield point 70,000 psi) for ladle hooks. Timken Roller Bearing Co. uses a graphitic, silicon-molybdenum steel with about 1.5 per cent C for cracker cutter dies. Carbon tool steel (1C) can't be hardened deeply enough to carry the load.

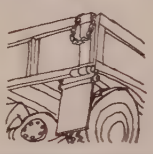


STRIKING DIES —When made from a carbon tool steel with 1 per cent C striking dies for stamping gold-filled spectacle temples broke after about 15,000 pieces.

SUGGESTION—Bausch and Lomb Optical Co. increased production to 100,000 pieces by changing to a low-alloy tool steel with about 0.5 per cent C, 1 S and 0.5 Mo. Difference in cost was negligible. Use of the alloy steel eliminated from 85 to 95 per cent of the breakage and reduced polishing time.

TRANSFORMER SHELLS — With trend toward larger generation stations, size and weight are problems.

SUGGESTION—Pennsylvania Transformer Co. uses a high-strength, low-alloy steel in place of copper-bearing carbon steel for the shells of three 29,000-kva, 230,000-volt transformers. Higher strength made possible the substitution of $\frac{3}{8}$ for $\frac{1}{2}$-inch plate, a weight reduction of 6000 pounds for each shell. Weight was cut from 24,000 to 18,000 pounds.



BODIES AND FRAMES — Competition and legal limits forced truckers to initiate weight-saving programs. Maintenance also is a big item here.

SUGGESTION—Example: For frames, underframes, body posts, purline and longitudinal members, high-strength, low-alloy steel, combined with proper frame design, may give weight savings up to 20 per cent or more, combined with improved corrosion and shock resistance. Stainless also is finding wide application.

HORSESHOE CALKS —Shoes for racing have toe and heel calks, sharply pointed pieces that project downward to prevent slipping. Shoe must be bent cold to fit horse's hoof. Hardened AISI-SAE 1060 did not have ductility to take the bend.

SUGGESTION—A molybdenum-silicon tool steel was used. It will bend cold at a hardness of Rockwell 58 to 60 without breaking. Longer life was the payoff. Carbon-steel calks last three weeks, while alloy-steel types wear seven weeks.

EXTINGUISHERS —Reliability, lightweight and appearance are the main requirements for fire extinguishers.

SUGGESTION—Buffalo Fire Appliance Corp. turned to stainless steel (type 301 for side sheet; type 302 for the dome) as a replacement for carbon steel, copper and brass. Greater strength meant that thinner metal could be used for even greater strength. Foam extinguisher, for example, is now lighter, stronger and does not need protective treatment.

COME SEE...

how Pittsburgh Purple Armored Gears are made

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Here is a perfect setup for steady, uninterrupted production of transformer core laminations at Westinghouse . . . a clear, fenced-off working area . . . automatic feed, slug disposal and piece part handling . . . and a *Danly Autofeed Press!*

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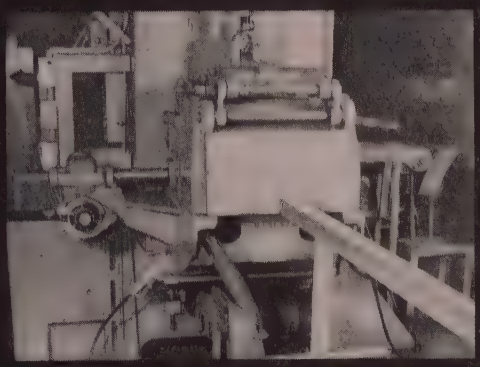
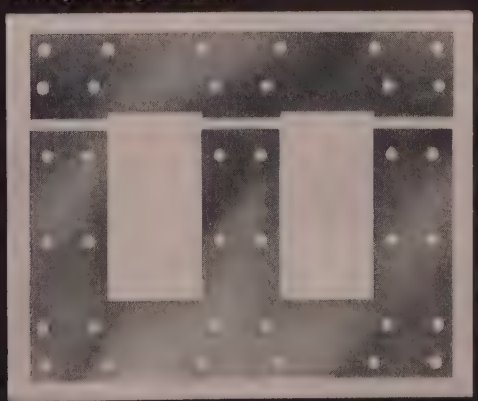
Dynamic CBC . . . (Counterbalancing Capacity) Engineered balancing of all moving parts under load, plus special design of press and counterbalance capacity to meet specific job needs, virtually eliminates "break-through" shock and "chucking"... makes press operation smoother, increases life of both press and dies.



Faster Material Handling . . . Feeding and scrap removal problems that go with high speed production are easily solved thanks to Danly's specially braced open bed construction. Slugs and scrap drop through the press bed and are continuously conveyed away as shown.



Longer Die Life . . . Costly carbide progressive dies are used to pierce, notch and cut off these .010" thick silicon steel laminations. In the Danly Autofeed, the dies average 750,000 pieces before regrinding is necessary.

Production costs cut 90%

WITH GRAY IRON

Gear cover fabricated from nine pieces. Arrows show cut-outs.

Made entirely in green sand, the Gray Iron castings were produced at one-tenth the cost of fabricated gear cover.

Formerly, nine separate pieces were shaped and welded into a fabricated gear cover for a braiding machine. Then, the manufacturer redesigned the gear cover for production in Gray Iron.

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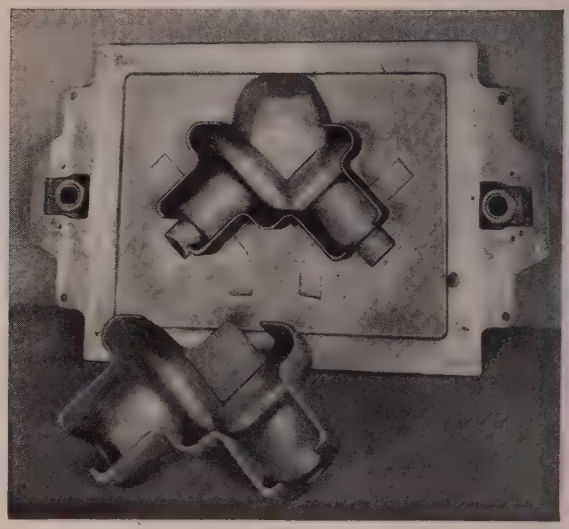
Look at the structural and functional requirements of your fabricated parts. You can undoubtedly use the unique characteristics of Gray Iron—and the economy offered by this casting process. Why not write us for more information?

Matchplate and gear cover.



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	Machinability	

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Plating string at Ford Instrument shows copper, cadmium and alodizing tanks in foreground. Nickel plating is done at far end, shown in right hand photo

Plating Nickel on Aluminum

Everyone recommended copper or cadmium, but Ford Instrument Co. uses a new system successfully. Nickel gives better resealing qualities on hermetically-sealed parts

By SAM BAKER
Associate Editor

NICKEL PLATING prepares nine aluminum components for tin-lead soldering into a hermetically sealed instrument case at Ford Instrument Co., Long Island City, N. Y.

Ford is said to be the first company to put this system into production. Aluminum companies and the government recommended use of copper or cadmium rather than nickel; most hermetically sealed instruments use one or the other. But the company found nickel gave better resealing ability. Copper would go into solution with the soldering metal when resealed. Tests show the nickel plated cases can be resealed as many as nine times. Nickel coat will adhere to the aluminum up to 500° F.

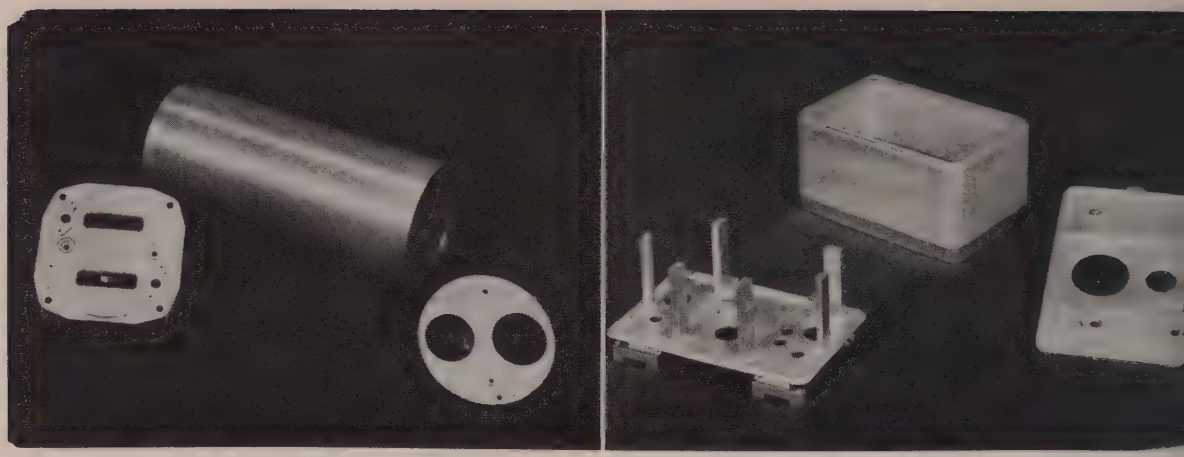
What and How — Components involved are computer case and two covers, pre-set case and two covers, and an indicator case and two covers. Forged parts are 61ST6 aluminum, and the parts of sheet and tubing are 52S0. All parts are given a nickel coating 0.0005-inch thick.

Here is the way the string operates: Ten tanks in the plating string range in size from 24 x 24 x 40 inches to dimensions of 42 x 36 x 42 inches.

In operation, parts are dropped in alkali solution for cleaning for

PREPARING ALUMINUM PARTS FOR NICKEL PLATING FOR SOLDER SEALING

1. Degrease.
2. Alkali clean 1 to 3 minutes at 140-180°F.
3. Cold running water rinse.
4. Sulphuric acid pickle—175-180°F for 2 to 5 minutes.
5. Cold running water rinse.
6. Nitric acid dip at 60-80°F for 1 to 3 minutes.
7. Cold running water rinse.
8. Sodium zincate dip—60-80°F for ½ to 1 minute. Agitate parts, making sure that all parts remain below the surface of the solution during agitation.
9. Cold running water rinse.
10. Strip zinc coating in concentrated nitric acid at 60-80°F.
    NOTE: Parts will be completely stripped when gassing ceases.
11. Cold running water rinse.
12. Alkali clean at 140-180°F for 10-30 seconds.
13. Cold running water rinse.
14. Nitric acid dip at 60-80°F for 1 to 3 minutes.
15. Cold running water rinse.
16. Sodium zincate dip at 60-80°F for ½ to 1 minute. Agitate parts.
17. Cold running water rinse.
18. Cold running water rinse.



Typical parts are these nickel plated indicator and computer control cases

one to three minutes at 140-180° F. This is followed by a cold water rinse and then a sulphuric acid bath at 175-180° F for two to five minutes. After a second cold water rinse the parts are immersed in nitric acid for one to three minutes at 60 to 80° F and given another cold water rinse.

Zinc Immersion—Parts are then immersed in sodium zincate solution (60-80° F) for 0.5 to 1 minute under agitation. Following a cold water rinse, the zinc coating is stripped in concentrated nitric acid at 60 to 80° F. Stripping is complete when gassing ceases. Then comes a rinse in cold running water, alkali cleaning at 140-180° F for 10-30 seconds and another cold water rinse.

This is followed by a second immersion in sodium zincate solution at 60 to 80° F for 0.5 to 1 minute, agitated to prevent black streaky zinc coating. The company finds it must repeat the zinc immersion to get proper zinc coverage. Fresh cleaning solutions are introduced into the line weekly, or more often; prior to these two moves, reject rate was as high as 40 per cent.

Then the Nickel—Following two more cold water rinses, the parts are immersed in nickel plating solution using a current density of 5 to 15 amps at 70 to 90 degrees F. Work racks are moved slightly and often to free gas bubbles that accumulate on work and thereby prevent "bare" non-nickel plated areas.

Large cans to be plated are placed with the grooved end down in the tank so that air will not be trapped in the groove, leaving a bare spot. After removal from the zinc tank parts are given a cold water rinse, followed by hot water rinse ar drying. Then they are wrappe in paper to safeguard handling.

Later, parts are placed in a oven at 500° F for 15 minute te and visual inspection for blister Set aside for a day or so, parts ar inspected again before being take to assembly room. There, lea tin powder mixture is painted o with a brush and parts are place in an oven at 400-420° F for ti ning. After tinning, sub-assemblie are joined by hand or oven solde ing, with standard 60-40 lead-ti solder.

Recent experiments have dete mined that fine sand blasting c case components and covers pric to plating helps in removing res due of oil from drawing and dril ing operations. Rejects fro blisters after sand blasting hav been virtually eliminated.

PRACTICE FOR NICKEL PLATING ALUMINUM PARTS

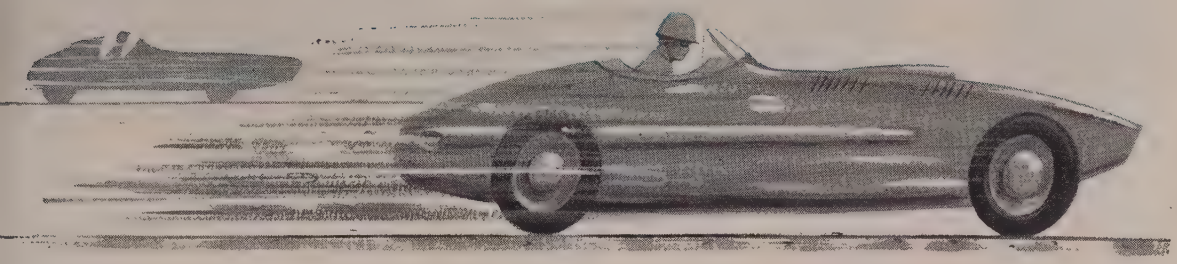
1. Clean anode and cathode bars periodically.
2. Maintain temperature of nickel plating solution between 70-90°F.
3. When placing work racks in tank, use the spring clamps provided to insure good electrical contact. Space the work racks evenly in the tank.
4. Turn on rectifier to plating tank, so that tank is "alive" to receive first parts. This will allow parts to plate immediately, and prevents the zincate coating from coming off in the nickel plate tank.
5. Plate with current density of 5-15 amps per square foot of work surface for time sufficient to produce specified plating thickness. Move the work racks slightly and often.

PRACTICE FOR STRIPPING NICKEL PLATE FROM ALUMINUM PARTS

1. Immerse parts in concentrated nitric acid solution maintained at room temperature for a time sufficient to remove all evidence of nickel plate.
2. Cold water rinse thoroughly.
3. Hot water rinse and dry.

NOTE: This same procedure may be used for stripping nickel from plating racks and clamps. It is important that all plating racks be nickel stripped before re-use, otherwise the nickel will contaminate the previous baths used to prepare the parts for nickel plating.

OR High Speed MACHINING



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Ready to give you on-the-job service . .

In slagging-off a 50-ton Swindell-Dressler electric furnace at Midvale, molten slag at about 2900°F falls directly into a 250-cu-ft capacity Johnston cinder pot

Cast steel container in foreground has completed job o loading hopper car with solidified slag. Corrugated p sides hasten cooling, simplify dumping, prevent distortio

Slag Disposal

MAJOR PROBLEM TO SIMPLE PROCEDURE

At Midvale, they can't dump slag. It's cooled and hauled away in hopper cars. New pots with corrugated sides, 7 to 10 times greater capacity, expedite cooling, handling

SLAG DISPOSAL from open hearth and electric furnaces at Midvale Co.'s Philadelphia plant has been reduced from a major problem to a simple procedure. The transformation was effected merely by substituting 250-cu-ft capacity cast steel cinder posts for small 25-cu-ft steel basins.

Effects of the switch are apparent throughout the plant. Housekeeping is improved. There's less need for transporting the large slag-filled containers, so much less spillage. In addition, the single overhead crane, which previously was tied up lifting and moving the slag basins, is now free for furnace-servicing jobs.

The Job—At Midvale, three 100-ton open hearth furnaces, and two 15-ton and one 50-ton electric furnace had to be serviced. The plant is in a somewhat unique position of having to dispose of all its slag outside the plant premises. There's no slag dump, since the works is situated in Philadelphia proper.

Thus, all slag must be cooled at the plant, then hauled away in railroad hopper cars. This meant a big part of the problem was to expedite slag cooling.

New Battery — Company engineers purchased a battery of 250-cu-ft capacity Johnston cinder pots from Mackintosh - Hemphill Co., Pittsburgh. Corrugated walls of these cinder pots permit fast heat dissipation and quick cooling of molten slag. Only a few hours after entering the pot at about 2900° F, slag cools and solidifies. The Johnston pots have 7 to 10 times greater capacity than the steel basins used before in slag disposal service.

Cinder pot is filled directly from the steel ladle during tapping of an open hearth; for electric furnaces, it's moved under the furnace door and slag-off is made directly into the pot. When a pot is full, the crane picks it up by its trunnion and moves it on to a hopper car When the pot is dumped, the solidi fied slag breaks up as it hits th car bottom.

Under Control—S. A. Ott, Mid vale's open hearth superintendent says the disposal system function 24 hours a day, five days a week and has the disposal problem unde control. He adds that corrugate design prevents pot distortion fron slag heat that would interfere with easy expulsion of the solid mate rial.

Another distortion preventiv is an expansible rim around th corrugations at the container's top This rim strengthens the open di ameter and helps prevent deforma tion.

Bottoms of the cast steel pot are coated with copper to form cushion between pot wall and an entrained metal. Result is to pre vent its adherence to container wal as metal solidifies.

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to help you produce fine pitch gears at lower cost!

Here is a completely new discussion of fine pitch hobs... including latest applicable standards together with data on types, tolerances, performance and application.

You'll learn about the Toolgraph* Chart, too... the exclusive, cost-saving "proof of accuracy" that you get with ILLINOIS TOOL WORKS Fine Pitch Hobs. This easy-to-read record of machine inspection eliminates complex, costly inspection operations in your plant.

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OL WORKS

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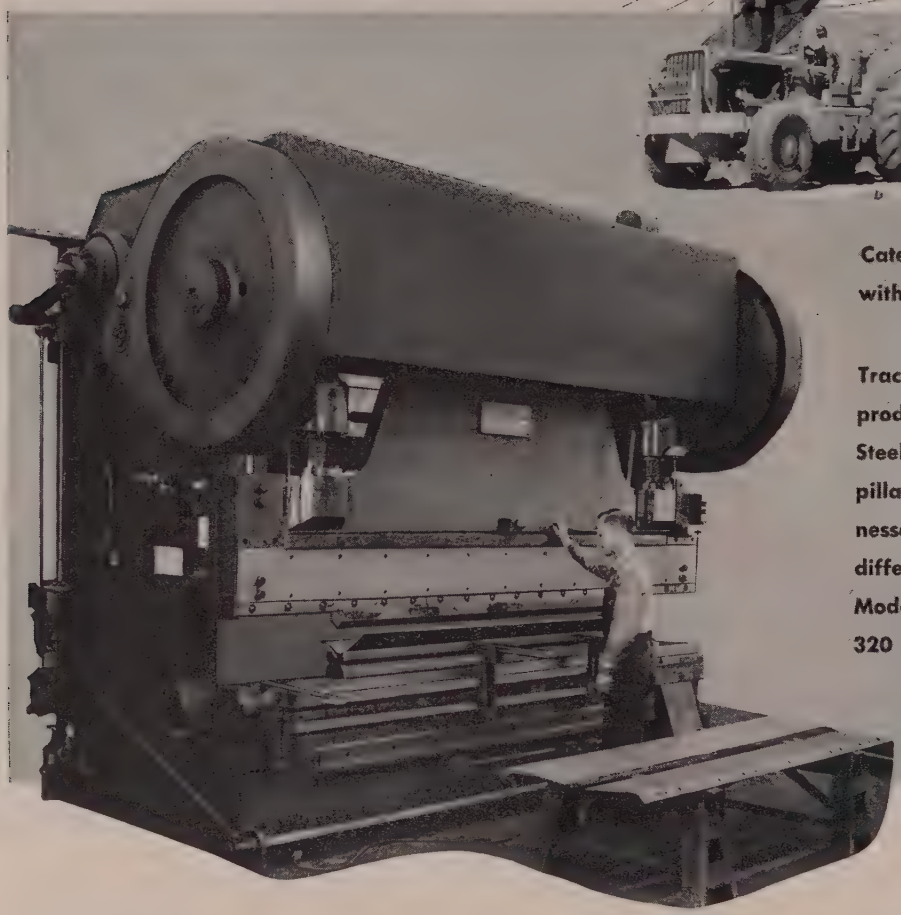
Illinois Tool Works Fine Pitch Hobs Are Available From Stock

*T.M. Reg. U. S. Pat. Off.

Caterpillar-Built Tractor Equipment
Speeded With
STEELWELD PRESSES



Caterpillar DW20 Tractor with W20 Wagon.

Tractor equipment parts produced on this and other Steelweld Presses at Caterpillar are of various thicknesses and require many different bends. This is a Model K5-10 Press rated at 320 tons.

THE ease and speed with which dies can be changed on Steelweld Presses and necessary adjustments made have proven a big asset in obtaining high production of a great variety of steel parts for scrapers, rippers, bulldozer blades and wagons at the Joliet Plant of Caterpillar Tractor Co.

Because of simplicity of Steelweld operation, the parts can be turned out quickly and accurately. The heavy quality construction, including solid one-piece frame, finest electrical equipment and automatic oilers for lubrication of all bearings, keep Steelweld Press maintenance extremely low and assure uninterrupted production.

GET THIS BOOK!

CATALOG No. 2010 gives construction and engineering details. Profusely illustrated.

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STEELWELD
BENDING PRESSES
BRAKING • FORMING • BLANKING • DRAWING • CORRUGATING • PUNCHING

ıtting Aluminum

Carbide blades used to cut 3SO aluminum at Fletcher Aircraft have never been changed

VER 120 MILES of metal have en cut by two saws being used at etcher Aviation Corp., Pasadena, lif.

Precision fit of the 6-foot indention that mounts over the wing- on 230 and 250-gallon Fletcher nks was responsible for design of is novel metal saw. Kennametal ntered tungsten carbide blades ed to cut the ⅛-inch 3SO alumim have never been changed or arpened on this big power tool.

Amazing Monstrosity — Nearly ,000 straight-center section Fletter tanks have gone through this

FROM 150 CUTS A DAY
. . . to 300 double cuts a shift

w since the unit went into operaon 22 months ago. One operator d a helper normally turn out 300 uble cuts during a regular shift. The "amazing monstrosity" was signed by Fletcher's chief tooling gineer in three weeks. It was ilt and operating one month ter. Before completion of this wer unit, it took four men with nd-operated routers to complete 0 cuts per day.

Rate of Feed—The saw is powed by two 3-hp motors turning inch saws at 3000 rpm, with a 25 m rate of feed. A combination compressed air and hydraulic rce maintains a smooth driving wer for the 6-foot cut of each w.

ATKINS

Silver Steel®

The Powerful Right Hand for All Your Metal Cutting!

Remember . . . it's the blade that does the cutting!

BUY ATKINS AND GET:

- The Right Alloy
- The Right Cutting Edge
- Consistent Low-Cost Operation
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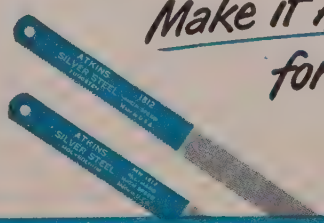
SILVER STEEL TUNGSTEN — the choice for the toughest jobs, for fast, efficient cutting of highly abrasive materials.

SILVER STEEL SOLID MOLYBDENUM — the economical all-round blade to cut both ferrous and non-ferrous metals.

SILVER STEEL WELDED EDGE MOLYBDENUM — it's shatterproof for top production and extra life in general purpose cutting.

Make it Atkins Silver Steel® for hand cutting too!



New improvements in Atkins metallurgy and manufacturing make these *Silver Steel* hand blades ideal for the most exact cutting. They're High-Speed Tungsten and High-Speed Molybdenum, either All-Hard or Flexible Back.

ATKINS Silver Steel SAWS

ATKINS

BW

ATKINS SAW DIVISION · BORG-WARNER CORPORATION
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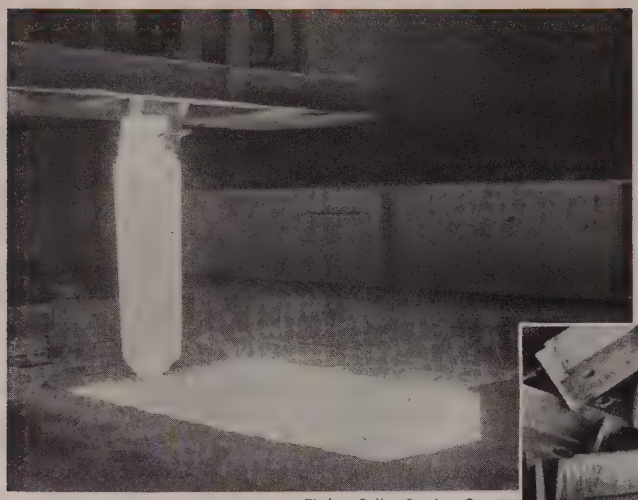


Timken Roller Bearing Co.

Type HH alloy cast seals on soaking pit covers extends average service life from three weeks to one year, saves 70 per cent weight

By E. A. SCHOEFER
Executive Vice President
Alloy Castings Institute
Mineola, N. Y.

Cast Alloys Tops For *Hot Spots*

Heat resistant properties of these high alloys put them in a class by themselves. Almost any combination of temperature and atmosphere conditions can be satisfied

INCREASED use of high alloy castings is accelerating the steel industry's program of expansion and modernization. To obtain the longer life necessary for economical and efficient operation, steel industry engineers are taking advantage of the heat-resistant properties of these cast chromium-nickel alloys.

What They Are—Cast high alloy materials that successfully meet the requirements of the engineer for use in a wide variety of temperature conditions, are shown in the accompanying chart of typical composition ranges.

In line with the designations of the Alloy Casting Institute, technical association of high alloy foundries, each of these alloy designations is prefixed with the letter "H" to denote that it is part of the heat-resistant series. A comparable series of cast materials for corrosion resistant applications is also available.

In heating sheet and plate, for example, the design of continuous heating furnaces would be impossible unless the engineer had at his disposal materials that could withstand high temperatures and temperature cycling, and resist the corrosive effects of gaseous products for long periods of time. Almost any combination of temperature and atmosphere conditions can be satisfied through the choice of a proper alloy combined with proper design.

Some Applications—The following are application problems and their solutions with various heat resistant castings.

SOAKING PIT COVERS

Operating temperatures — 2150 *to* 2450° *F*

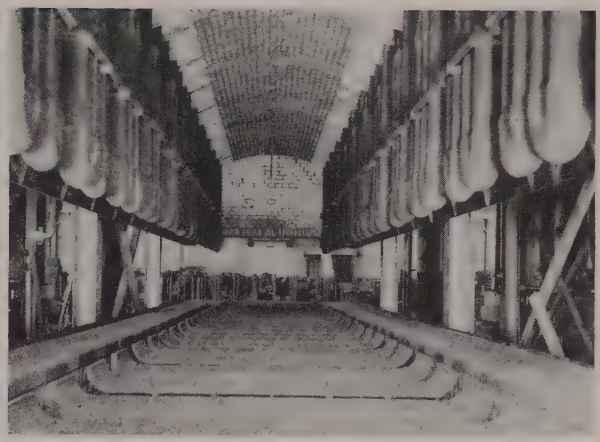
Undersides of heavy steel and firebrick - constructed covers are

MECHANICAL PROPERTIES
(Not Specification Values)

	ALLOY TYPE HD	HH*	HT
Short Time—Tensile Str., psi			
70 F	85,000	85,000	70,000
1400 F	36,000	35,000	35,000
1600 F	23,000	22,000	18,800
1800 F	15,000	11,000	11,000
Yield Str., psi			
70 F	48,000	40,000	40,000
1400 F	.....	18,000	26,000
1600 F	.....	14,000	15,000
1800 F	.....	7,000	8,000
Elong., % in 2"			
70 F	16	15	10
1400 F	14	12	10
1600 F	18	16	26
1800 F	40	30	28
Creep Strength, psi (0.0001%/hr. rate)			
1400 F	3,500	7,000	8,000
1600 F	1,900	4,000	4,500
1800 F	900	2,100	2,000
Stress-Rupture, psi (100 hours)			
1400 F	10,000	14,000	18,000
1600 F	5,000	7,500	8,500
1800 F	2,500	4,000	4,500

*Wholly austenitic type.

edesign of wire annealing "lead pan" in type HH alloy sulted in much longer service life and less weight



Radiant-tube furnaces for annealing and carbon restoration of bar stock use type HT for tubes and supports

rotected by cast alloy angle-type eals with lips that must penetrate ito the sand seal to maintain op-rating pressure in the furnaces. msler Morton Corp., Pittsburgh, ypical builder of soaking pits, uses ype HH alloy that has high rength, ductility and corrosion esistance at temperatures of 000° F. This grade can be pro-uced as partially ferritic or whol-austenitic, choice depending on mperature of operation and mechanical properties required. Ferritic type provides higher hot ductility and the austenitic, higher hot strength.

FURNACE DAMPERS

Operating temperatures—900 *to* 1900° *F*

Dampers are raised or lowered in soaking pit furnaces to maintain proper operating pressure in the furnace by allowing more or less hot gas to go out the stack, thereby relieving or building up furnace pressure. Alloy must not only resist high temperatures and corrosive elements in the gases, but be sufficiently strong to resist tendencies to bow under the gas pressure.

Type HH alloy has worked successfully in this application. Sectional damper design permits uniform independent expansion in each section. To minimize seepage, various sections are mated by tongue and groove fit; bottom sections are

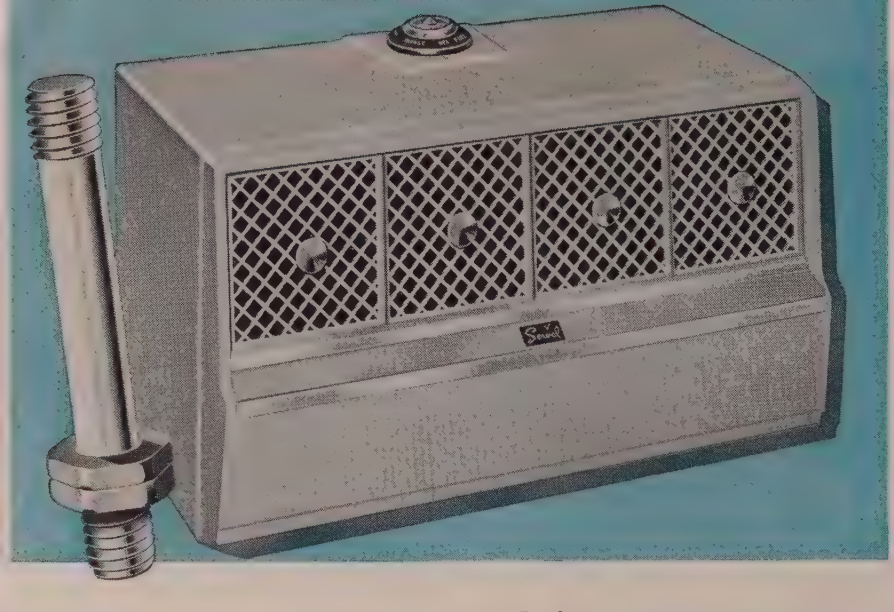
STANDARD DESIGNATIONS AND CHEMICAL COMPOSITION RANGES FOR HEAT RESISTANT CASTINGS

CAST ALLOY ESIGNATION	WROUGHT ALLOY TYPE (See Note A)	Composition—per cent C	Mn max.	Si max.	P max.	S max.	Cr	Ni	Other Elements
HC	446	0.50 max.	1.00	2.00	0.04	0.04	26-30	4 max.	Mo 0.5 max.*
HD	327	0.50 max.	1.50	2.00	0.04	0.04	26-30	4-7	Mo 0.5 max.*
HE	...	0.20-0.50	2.00	2.00	0.04	0.04	26-30	8-11	Mo 0.5 max.*
HF	302B	0.20-0.40	2.00	2.00	0.04	0.04	18-23	8-12	Mo 0.5 max.*
HH	309	0.20-0.50	2.00	2.00	0.04	0.04	24-28	11-14	Mo 0.5 max.* N 0.2 max.
HI	...	0.20-0.50	2.00	2.00	0.04	0.04	26-30	14-18	Mo 0.5 max.*
HK	310	0.20-0.60	2.00	3.00	0.04	0.04	24-28	18-22	Mo 0.5 max.*
HL	...	0.20-0.60	2.00	3.00	0.04	0.04	28-32	18-22	Mo 0.5 max.*
HT	330	0.35-0.75	2.00	2.50	0.04	0.04	13-17	33-37	Mo 0.5 max.*
HU	...	0.35-0.75	2.00	2.50	0.04	0.04	17-21	37-41	Mo 0.5 max.*
HW	...	0.35-0.75	2.00	2.50	0.04	0.04	10-14	58-62	Mo 0.5 max.*
HX	...	0.35-0.75	2.00	2.50	0.04	0.04	15-19	64-68	Mo 0.5 max.*

Molybdenum not intentionally added.

NOTE A—Wrought alloy type numbers are listed only for the convenience of those who want to determine corresponding wrought and cast grades. Because the cast alloy chemical composition ranges are not the same as the wrought composition ranges, buyers should use cast alloy designations for proper identification of castings.

NOTE B—Most of the standard grades listed are covered by American Society for Testing Materials specifications A 296-49T and A 297-49T.



Townsend Saves Servel $14,624 On Part For Electric Room Air Conditioner

The many luxury features you enjoy with Servel's electric room air conditioner stem from careful attention to every detail of design and assembly. This enables Servel to provide the benefits of better health and greater comfort in an efficient, moderately priced unit.

This is possible because no part is too small to be thoroughly analyzed as to function and cost. For example, the part shown here is one of the reasons for the efficient assembly of the unit. Four of them are used to mount the compressor, hold it securely in position to help assure smooth, quiet performance.

Until a Townsend engineer devised this improved part, Servel used an expensive machined part. It was cut from a hexagon bar, tapped to receive a bolt which was held in place by a lock washer.

The part as redesigned by Townsend is made in one piece by cold-forming—threads are rolled for greater strength and accuracy. The bolt was eliminated and replaced with a nut and lock washer in the assembly. Scrap loss was cut to virtually zero. The Townsend part is stronger and just as accurate. Annual savings amount to $14,624. Servel effects a big reduction in overall costs—at the same time produces a unit that is jam-packed with quality and performance.

This is merely one example of how the Townsend method of producing fasteners and small parts saves thousands of dollars annually for cost-conscious manufacturers in many industries. On material alone, other companies save from $3.00 to $125 per thousand pieces—have reduced assembly time and improved their products as well.

In addition to making the best possible products, Townsend has the versatility to produce regularly more than 10,000 special and standard types. It has the capacity to produce these items in tremendous quantity—60 million every day.

This all adds up to why Townsend has become known as "The Fastening Authority"—a reliable source of quality fasteners at reasonable cost. To learn more about the possibilities of new economies in your operation, write for Bulletin TL-89. Or send samples or sketches of the parts you wish improved and we will have one of our engineers call to discuss your problem.

Townsend

COMPANY • ESTABLISHED 1816

NEW BRIGHTON, PENNSYLVANIA

Sales Offices in Principal Cities

Cherry Rivet Division • Santa Ana, California

THE FASTENING AUTHORITY—Experience: *over 138 years*—**Capacity:** *sixty-million parts daily*–**Products:** *over ten-thousand types of solid rivets–cold-headed parts–Cherry Blind Rivets–Twinfast Screws–self-tapping screws–tubular rivets–locknuts–special nails–formed wire parts.*

Plants: *New Brighton, Pa.—Chicago, Ill.—Plymouth, Mich.—Santa Ana, Calif.*

In Canada: *Parmenter & Bulloch Manufacturing Company, Ltd., Gananoque, Ontario*

specially designed to withstand abrasive action.

If furnace gases are high in sulphur content, types HD or HE alloys are used. These lower nickel grades have better resistance to the sulphur-containing gases.

SKID RAILS

Operating temperatures — 2300° *F (furnace)*, 1800° *F (rails themselves)*

Much the same conditions that exist in soaking pits are found in billet reheating furnaces. Steel is moved through on skids; a cold piece charged at one end pushes a heated piece out the other end of the furnace. Best efficiency is obtained in long, continuous furnaces whose hearths are completely covered with steel. In many cases water-cooled skids are being replaced by cast skid rails made of HT alloy, thus eliminating water cooling.

Ingersoll Products Division, Borg Warner Corp., made such a replacement in their Chicago plant and effected an immediate weight saving of about 35 per cent. More important, the change to the nickel-chrome alloy has more than doubled the life of the skids.

SHEET AND BAR ANNEALING

Operating temperatures — 1650 *to* 2100° *F*

In annealing cold rolled strip and sheet, products of combustion must be kept from the material being processed to avoid corrosion of the surfaces. This is done by passing the hot gases through radiant tubes which reach about 1650° F during annealing. Type HH is frequently chosen for the tubes. Same alloy is used in annealing retorts for such products as tool steel. HH is very useful where exposure to high-sulphur content, anthracite producer-gas is used.

In annealing and carbon restoration furnaces for bar stock, where temperatures go up to 1800° F and above, alloy chosen for tubes and the bar-supporting bucks is the HT type. This high nickel-chrome alloy contains up to 1.25 per cent silicon for increased resistance to carburization, and operates satisfactorily in oxidizing atmospheres up to 2100° F and up to 2000° F in reducing atmospheres. Alloy is fully austenitic and notable for its hot strength.

WIRE TEMPERING

Operating temperatures — 1600 1650° *F* (*lead-pan tempering*)

This tempering operation is car-ed out by drawing wire through olten lead at the above tempera-res. For many years, heavy-alled cast iron pans (two to three ch section thickness) were used. ns were heavy, needed heavy rnace construction to support em, and failures from combina-ns of rapid scaling and deforma-n due to low strength resulted in erage service life of 22 to 30 op-ating days.

Type HH cast alloy pans proved be considerably lighter, so fur-ce construction need not be so rdy.

Furthermore, the thinner wall ction permitted more rapid heat-g of the molten lead. In one in-ance, the alloy pan was removed ter 24 months of operation which eant increased efficiency of oper-ion, reduction of maintenance and angeover time.

METALLIC RECUPERATORS

Operating temperatures — 1400 2000° *F*

Higher gas pressures and higher s volumes required by modern ating furnaces, coupled with in-easing fuel costs, have made eel producers more aware of the vantages of metal recuperators er the ceramic types.

In a paper given at the annual eeting of the AISE, E. A. Vierow, oungstown Sheet and Tube Co., inted out that recent installa-ns of metallic recuperators have own effective heat capacity to be creased as much as 20 per cent th fuel savings up to 30 per cent. Choice of the proper cast heat-sistant alloy depends on applica-n conditions. For instance, Ther-al Transfer Corp., Pittsburgh, es HD where moderate stress is countered up to 1400° F and hter duties up to 2000° F; HD sists oxidation and high-sulphur nospheres. Type HB is used here temperatures run up to 50° F; and HC, where they run to 1800° F. Both of these al-s are for relatively low load ap-cations, and where high loads e encountered, the higher nickel oys such as HH and HT are en used.

How To Enjoy The Economy Of Townsend Cold-Formed Parts

The parts above are not only less expensive than similar items made by other methods, but they are currently saving assembly time, improving quality, design, and appearance of a multitude of products for economy-minded production engineers and designers in many industries.

These parts are but a few of the thousands of types of special parts and fasteners made by the Townsend method which, because of its speed, is economical. Since there is virtually no scrap, material is conserved—you get more pieces per pound of metal.

In many instances it is possible to include washers, nuts and spacers as integral parts of the piece. This reduces assembly time and employee fatigue—eliminates separate inventories and extra parts.

Design is simplified by the Townsend method since it is possible to cold-form unusual shapes such as offsets, wings, flats, ovals—they need not be symmetrical and concentric as with screw machine parts. The basic shape then may be further processed by machining, trimming, flattening, bending, drilling and thread rolling.

Since cold-forming increases tensile strength and the flow lines of the metal follow the contours of the piece, your product is improved by having extra strong parts with high resistance to shock and fatigue. Also, Townsend draws its own wire specifically for each application which assures close size tolerances and uniformly good surface finishes. The inherent quality of the parts is high because materials that can be readily cold-formed must be free from inclusions, seams and surface defects. They also must be ductile and highly resistant to cracking.

Townsend supplies these high-quality items in carbon, alloy, stainless steel, copper, bronze, monel, and aluminum in a variety of platings and finishes. Sizes range from diameters of .090" to 1" and lengths of ⅛" up. For more information on the economy of Townsend products, use the coupon below or write for illustrated bulletin.

Townsend

COMPANY • ESTABLISHED 1816

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WHEN YOU BUY STEEL FROM WAREHOUSE, YOU GET:

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- FEWER INVENTORY LOSSES

CUTTING your own steel can be expensive. For it takes production time, and a big investment in expensive machinery. U. S. Steel Supply can help you avoid these costs by tailoring steel to your specifications on the most modern cutting equipment available. For example, we can flame cut plates to the most complicated pattern, without error. Ask your U. S. Steel Supply salesman to give you complete information about our steel cutting service.

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NEW PRODUCTS and equipment

Reply card on page 139 will bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue

elding Process

. . . has all controls inside

A new welding press with all ping, controls and wire located side a streamlined frame is an- unced by E. W. Bliss. It is ailable in four sizes with under- ive and conventional drive ar- ngements. Beds are 12 inches

ep with widths ranging from 42 84 inches. Strokes are 8 and 10 ches, or 8 and 12 inches. Available are two models, the 4LU d 4L series. Lower die is sup- rted at four points to assure ac- rate positioning. The 4LU series designed with the driving unit in e base for shops with limited adroom. They can be built to commodate practically any size ction. E. W. Bliss Co.

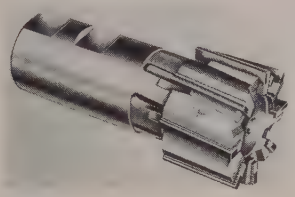
R MORE DATA CIRCLE NO. 1 ON REPLY CARD

d Mills

. . . available in two series

A line of straight shank heavy- ty carbide blade end mills is ailable as a stock item from God- rd & Goddard. Mills are avail- le in two series, one for milling cast iron and nonferrous metals, the other for milling steel. Blades carry a grade of carbide suitable to the particular milling operation.

They have a 2-inch diameter



shank. Cutting faces range from 2 to 4 inches in diameter. A Serra-tip blade, a relatively thick carbide blank brazed to a thin metal backing thick enough to provide a serrated surface, is incorporated. Goddard & Goddard Co.

FOR MORE DATA CIRCLE NO. 2 ON REPLY CARD

Liquid Inhibitor

. . . also controlled foam blanket

Oakite Pickle Control No. 5, is a liquid inhibitor for sulphuric, hydrochloric or phosphoric acid or mixtures thereof. In addition to its efficient inhibiting action, it also provides a controlled foam blanket on pickling solutions.

Manufacturer reports it should prove particularly effective in continuous steel strip mills where inhibitors are added through proportionating equipment, as well as in batch pickling operations, due to the ease of making additions. Oakite Products Inc.

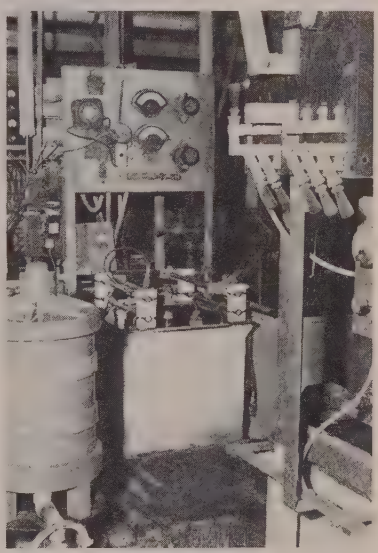
FOR MORE DATA CIRCLE NO. 3 ON REPLY CARD

Plastic Filter

. . . temperature-testing pigments

A geon rigid vinyl plastic is being used to construct a new type filter. Filters, fittings and inside rings are all machined with tolerances as close as 0.003 inch. Filters are about 20 inches high and have a 14-inch OD. There are 40 filter papers inside the drum, giving 5000 sq in. of filtering area. Capacity is 30 gallons per minute.

First production models have been in service almost 1½ years at Cleveland Graphite Bronze Co.



in corrosive nickel plating bath operations. No signs of wear have been evidenced. B. F. Goodrich Chemical Co.

FOR MORE DATA CIRCLE NO. 4 ON REPLY CARD

Respirator

. . . filters wide area

A respirator, Super Micro-Toxisol, is designed for removing airborne radioactive matter and other toxic dust, mist and fumes. It protects against spores, viruses, bacteria, fungi and compounds.

An effective filtering area of 45 sq in. is contained in a compact unit which does not interfere with the wearer's vision. The large filter area in a small unit is achieved

New-type multi-purpose box

BOOSTS PRODUCTION CUTS COSTS!

Check these WORK-O-MATIC* features!

4-In-One Box—
Dumps, Work Positions, Transfers, Stores.

1 **WORK-O-MATIC DROP-BOTTOM BOX.** Exclusive Union Metal square corner box of heavy gauge corrugated steel, with outturned 1" triangular bead flanges at top and bottom.

2 **CORNER STACKING ANGLES.** Permit safe group stacking—one box on another—saving valuable floor space by putting air space to work. Designed to stop end or side shifting.

3 **HINGED CHUTE BOTTOM.** Lowering of operator-controlled truck forks hinges bottom downward, automatically sliding parts into work-level tray.

4 **HEAVY-DUTY WORK-POSITIONING STAND.** Receives box from back or sides. Is safely, easily transported by lift truck from one work station to another when desired.

5 **CONTROL GATE.** Vertical adjustment controls constant flow of different size parts to service the work station.

6 **WORK-LEVEL TRAY.** Feeds parts to work station eliminating costly, tiring, hazardous stretch-bend-stoop methods. *Reservoir feature* cuts "down time" during interchange of supply boxes.

7 **SLOPING TRAY END.** Assures maximum part accessibility. Easily removed during "job finish-off". Speeds job changes.

These are only a few Work-O-Matic features making as much as 52.8% production gains at thousands of work stations. Get all the facts by writing to The Union Metal Manufacturing Company, Canton 5, Ohio, for Folder MH-809 and T. & M. Studies.

*Patent No. 2,445,038. Other patents pending.

UNION METAL
Materials Handling Equipment

by shaping the filter element in th form of a multifolded corrugate cylinder. Each unit is containe in a lightweight aluminum car tridge. Respirator face pieces tak two filters providing a total filter ing area of 90 sq in. per respirator American Optical Co.

FOR MORE DATA CIRCLE NO. 5 ON REPLY CARD

Snagging Wheel

. . . requires less dressing

The K bond snagging wheel i designed for Crystolon silicon car bide wheels in rough grinding cas iron. Advantages include les dressing required to keep it sharp the corners hold up longer withou rounding, and wheels can be con sistently duplicated from wheel t wheel and lot to lot. Operator fa tigue is reduced.

Wheels can be made in all sizes shapes, grit sizes and grades use on floor stand, bench stand, swin frame and portable grinders o slow speed type for snagging gra and hard malleable iron castings Norton Co.

FOR MORE DATA CIRCLE NO. 6 ON REPLY CARD

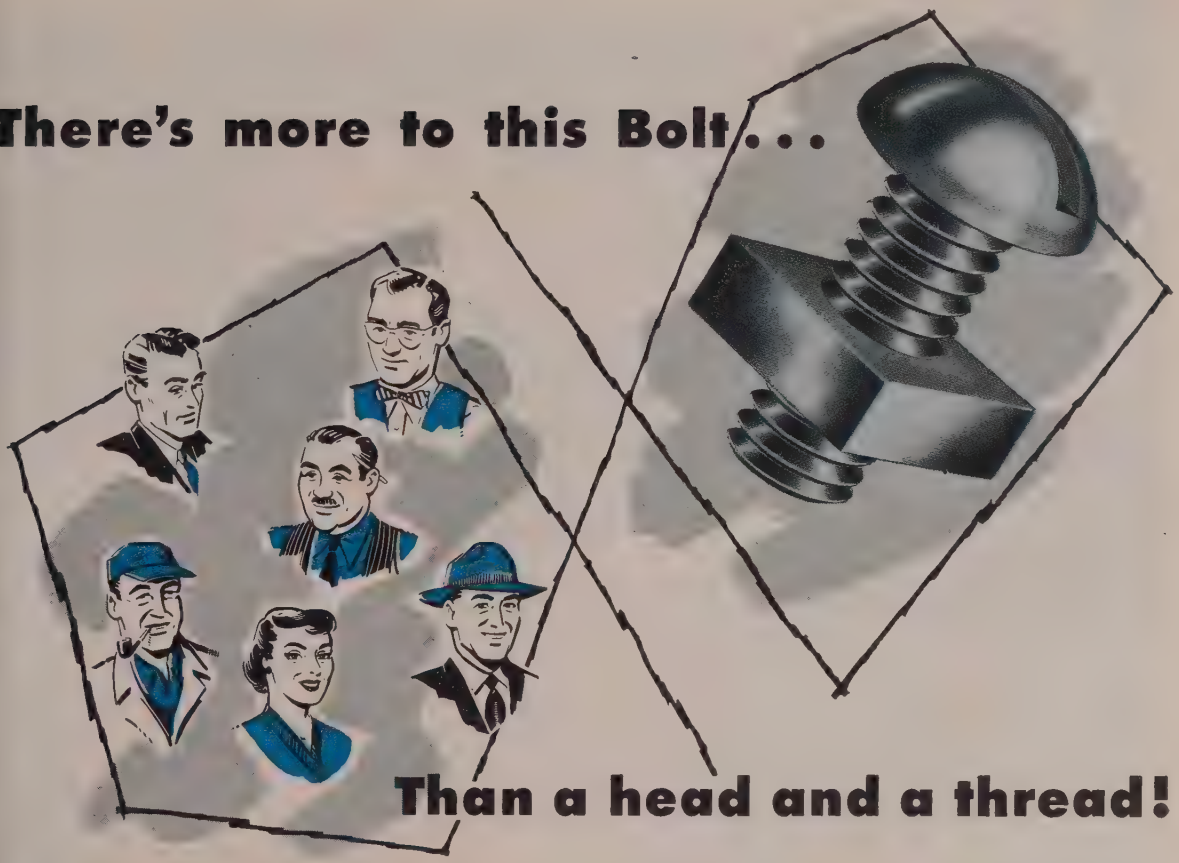
Combination Machine

. . . straightens, cuts tubing

A compact combination machin straightens and cuts off varyin lengths of ferrous or nonferrou tubing from coiled stock from ⅛ to 1-inch diameter in adjustabl lengths up to 6 feet.

Designed as a utility, low cos

There's more to this Bolt...



Than a head and a thread!

Yes, there are many more things than meet the eye, even behind the most common type of bolt.

Such things as the *people* who engineer, manufacture, package, sell and ship these bolts.

Such things as the *pride* they take in turning out products that have a little extra something.

Such things as *skill* and *craftsmanship*, that are unseen but still noticed in the finished product.

Such things as *consideration* and *pleasure* in dealing with customers.

These, then, are the "plus" features behind every Lamson Fastener. The reasons why we are proud of our continued growth and our ability to meet your requirements for any fastener need.

Your Lamson & Sessions representative can show you how it is often possible to save time and money by using "Standard" Lamson fasteners. Or, when the situation calls for it . . . a Lamson Engineered "Special".

Lamson & Sessions

The LAMSON & SESSIONS Co.
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Plants at Cleveland and Kent, Ohio • Birmingham • Chicago

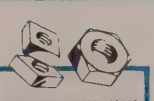
FOR PROMPT DELIVERY AND HELPFUL SERVICE, ORDER FROM YOUR LAMSON DISTRIBUTOR

CHINE SCREWS
ecision made for t, economical embly.

PLUG NUTS
Ideal for blind or hard-to-reach places.

TAPPING SCREWS
Choice of round, pan, truss, flat oval, hexagon and Phillips heads.

CAP SCREWS
"1035" Hi-Tensile Heat-treated steel.



SQUARE AND HEX MACHINE SCREW NUTS
Also semi-finished, hot pressed and cold punched nuts.

LOCK NUTS
Economical, vibration proof. Can be used repeatedly.

COTTER PINS
Steel, brass, aluminum and stainless steel.

"1035" SET SCREWS
Cup point type, hardened and heat-treated.

machine for small lot production runs, it features flexibility of operation and quick changeover for various tube diameters and lengths.

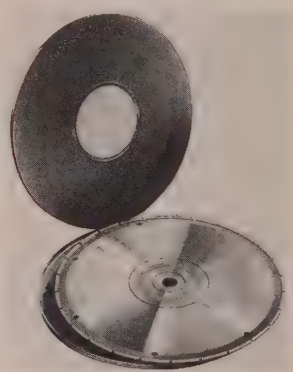
Coiled tubing up to 24 inches in diameter can be handled. It has hand-fed straightening rolls and a manually-controlled, hydraulically-fed cutoff wheel. Walter P. Hill Inc.

FOR MORE DATA CIRCLE NO. 7 ON REPLY CARD

Diamond Blades

. . . for lightweight aggregates

A new wear-resistant diamond blade for use on lightweight aggregate concrete products is announced. Initial specification being manufactured is the 14-inch Target



Number 4 Red. Previously, these blades were recommended for use only on hard, vitreous materials.

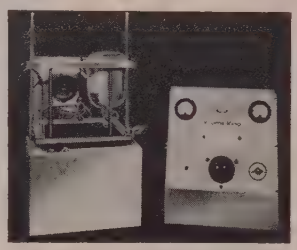
Blades are individually packaged in storage metal containers for protection when not in use. Robert G. Evans Co.

FOR MORE DATA CIRCLE NO. 8 ON REPLY CARD

Plating Process

. . . in-the-shop application

Krome-King is the name given to a new and simplified precision plating process designed for use right in your own shop. Worn or mismachined parts are reported back on the job in a matter of minutes



with this economical chrome electroplater and chrome solution.

Plating to within 0.001 inch, reduction in production down time and ease of operation are its assets. It produces a hard ductile chrome which will absorb shock without chipping or peeling. National File Co.

FOR MORE DATA CIRCLE NO. 9 ON REPLY CARD

Nonsparking Truck

. . . no radio interference

Yale & Towne has developed an electric truck in which radio or radar installations can be used, in plants where two-way radio is employed, around industrial or commercial television installations and near many electronic devices.

Severe interference in reception was traced to sparking in the electrical contacts of battery-powered industrial trucks operating near electronic equipment. Electrical circuit utilizing capacitors eliminates sparking of commutator contacts. Yale & Towne Mfg. Co.

FOR MORE DATA CIRCLE NO. 10 ON REPLY CARD

Steel Shear

. . . for cutting mild steel

An all-steel shear made by Cincinnati Shaper is capable of cutting mild steel 1½ inches thick by 4 feet long.

The shear is equipped with a front-controlled power-operated back gage, having 48-inch back gage range. Back gage angle itself is hinged. Of interlocked construction, the machine is powered by a silent worm gear drive, has hardened multiple jaw clutch, hydraulic hold-downs, light bear shearing gage, ball transfers in th

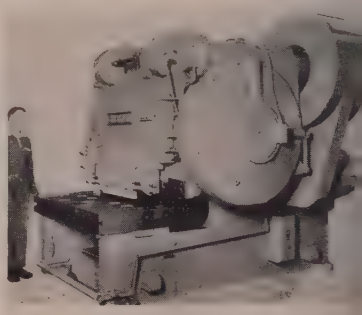


table for easy feeding of heav plate, safety friction to the fly wheel. Cincinnati Shaper Co.

FOR MORE DATA CIRCLE NO. 11 ON REPLY CARD

White Alumina Lining

. . . better glaze and bond

An improved crucible lining o white alumina has been develope by Electro Refractories for meltin high nickel-iron alloys. One of th major features of the lining is it ability to take a better glaze an improve bond strength.

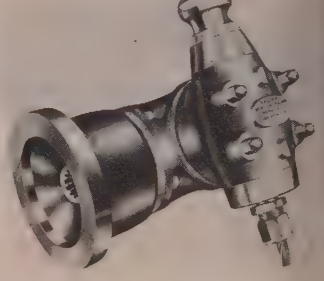
Even cast iron may be success fully melted in the alumina-line crucible. The lining is said to re tain heat conductivity and othe beneficial properties of the mai body of the silicon carbide cru cible. Electro Refractories & Abra sives Corp.

FOR MORE DATA CIRCLE NO. 12 ON REPLY CARD

Milling Attachment

. . . speed range to 4500 rpm

A high speed, heavy-duty, all universal milling attachment ha lapped-in, heat-treated, spiral beve



compound miter gears, running si lently in oil. Speed range has bee increased to 4500 rpm, with ba bearing mounting throughout. Ca

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THE 1954 IRON and STEEL EXPOSITION

CLEVELAND PUBLIC AUDITORIUM, Cleveland, O.
SEPTEMBER 28, 29, 30 and OCTOBER 1

Learn...

Whether your interests are design, construction, operation or maintenance—your job requires that you *see* the latest equipment, supplies and services displayed by over 200 companies—and *hear* papers presented at the technical sessions on every phase of steel production by the industry's most outstanding authorities.

Benefit...

The benefits derived from viewing the displays, hearing the technical sessions, and the individual discussions you will have with men whose problems are similar to your own, will more than compensate for your time. Don't miss it. Join the more than 15,000 men who will attend—who know from past experience the value of this great Exposition.

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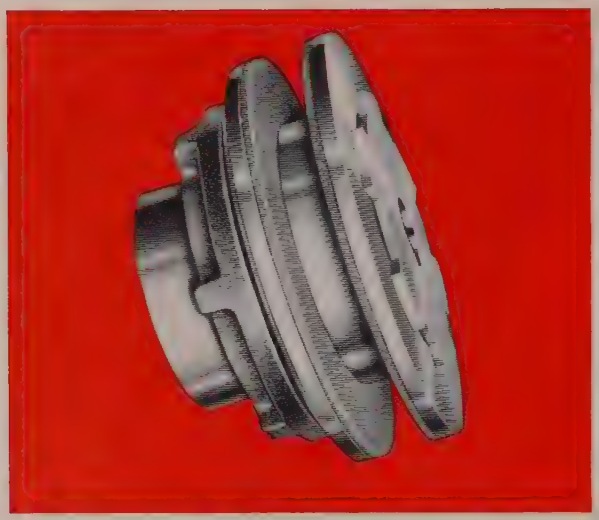


Torque Limiter

200-Series Cam Clutch

NOW! Two new MORSE products to solve design and maintenance problems

1. New Morse Torque Limiter

Eliminate the inconvenience, expense and machine downtime connected with resetting shear-pin mechanisms. The Morse Torque Limiter is torque-sensitive, compact and tamperproof.

Torque adjustable and adaptable, the Morse Torque Limiter can be used with sprockets, gears or pulleys. It gives positive protection on machine drives and automatically slips at overload setting and resets when overload condition is corrected.

The Torque Limiter is available from stock in diameters from 3″ to 10″; maximum ratings from 20 through 628 ft.-lbs.

2. New 200-Series Cam Clutch

The simplicity of design, ease of installation and maintenance make Morse 200-Series Cam Clutches as adaptable as bearings for indexing, over-running and backstop applications.

Ground to same outside diameters as 200-series bearings, they will fit housings bored to accommodate these common bearing sizes.

The Morse 200-Series Cam Clutch combines maximum torque capacity with minimum space requirement. It is a self-contained assembly, furnished without inner races; can be mounted directly on shafting. Clutches are furnished pre-lubricated, ready for immediate installation.

Get more details. For information on Morse Torque Limiter, write today for Catalog C 14-54. For information on 200-Series Cam Clutch, ask for Catalog C 12-54. **Morse Chain Company, 7601 Central Avenue, Detroit 10, Michigan.**

MORSE

PRODUCTS OF BW BORG-WARNER

MECHANICAL POWER TRANSMISSION PRODUCTS

FOR 24 REASONS, MASTERS OF MECHANICAL POWER TRANSMISSION SINCE 189

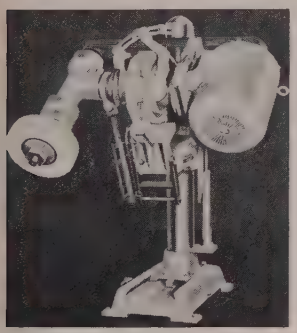
city of gear rating: 1½ to 15 hp. The milling head is available in sizes and models. It may be ounted in two plane positions on horizontal milling machine. own Vertical Milling Head Co.

MORE DATA CIRCLE NO. 13 ON REPLY CARD

lishing Head

. constant, full contact

Murray-Way announces a heavy-ty multi-positioning buffing head. odel 55 can be positioned for y job by means of a simple, con-nient adjustment control on the ont of the head. It can be ro-ed in a full 360-degree swing on th axes, simultaneously; and au-matic positioning provides con-nt, full contact on even the most



egularly shaped piece. An ad-stable float restrictor controls degree of rise and drop of the eel.

Pneumatic controls for wheel -off are available for full auto-tic installations. Murray-Way rp.

MORE DATA CIRCLE NO. 14 ON REPLY CARD

e-Hand Cutter

. has heat-treated blades

Heat-treated blades for longer ting life are one feature of the rter one-hand 8T cutter. Faster

eration is allowed by a spring ich keeps tool open to cutting

"SECOND-BEST" FORGINGS WOULDN'T DO!

In frontier days, the backwoodsman called upon the most skilled blacksmith available to fashion a bowie knife of great strength, for often the backwoodsman's very life depended upon the quality of its blade. Today, when forgings are subjected to tremendous stresses, it is equally important that they be produced by trained specialists, combining expert skill with pride of workmanship, to make sure they will stand up to the rigid requirements of the jobs they are designed to do.

Consolidated Industries, Inc. is recognized as a leader in the manufacture of forgings of unmatched strength and quality in aluminum, titanium, alloy steel and other metals. Consolidated has the skilled personnel, engineering and production techniques and facilities (including a new die shop with the most modern of die sinking machines) that assure you the *very best* — not "second-best" — forgings.

Write for complete information today.

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INDUSTRIES, INC.
305 MIXVILLE ROAD
WEST CHESHIRE, CONNECTICUT, U.S.A.
West Coast Representative:
A. C. Stearns Co., 3911 San Fernando Road, Glendale, Calif.

position and a thumb lock which keeps tool safely closed when not in use.

Sharp pointed lower jaw fits easily under tight strapping or baling wire for quick cutting. A thin, flat blade prevents damage to container or contents. A notch in the lower blade keeps round wire in position for cutting, and a keeper keeps strapping or wire straight in the jaws when precutting. H. K. Porter Inc.

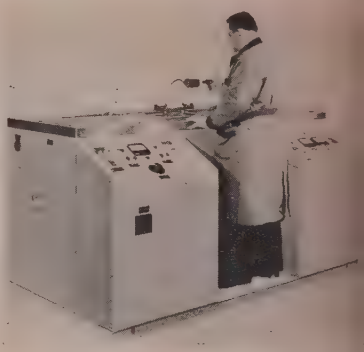
FOR MORE DATA CIRCLE NO. 15 ON REPLY CARD

Induction Heating Tool

. . . combines generator, table

Models K400 10C and K400 20C high-frequency induction heating units combine current generator and worktable in a single cabinet. Rated outputs are a full 10 or 20 kw. The units are rated for continuous duty. A large, unobstructed 33 x 100-inch worktable forms the top of the generator cabinet.

Exact temperature needed to degasify, without impairing the element, can be obtained automatically, using the Kilotron. The table top is of stainless steel, backed by insulation to eliminate reverbera-



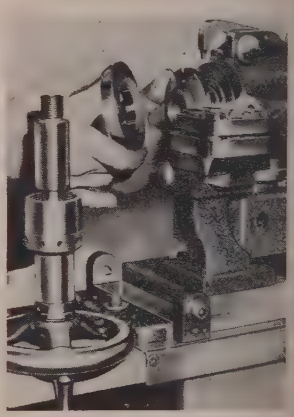
tion and heat transfer. Control is automatic or manual. Electric Arc Inc.

FOR MORE DATA CIRCLE NO. 16 ON REPLY CARD

Grinding Fixture

. . . form-relieving standard

A universal form relief grinder has simplified setup and operations to the point that form relief can now be made the standard grind for most end and side cutting tools.



The Royal Oak relieving fixture moves on hardened and ground ways operating on preloaded roller bearings. The motion is on a plane, the tool moving into the wheel on center for the entire grind, with better control and elimination of vibration. Royal Oak Tool & Machine Co.

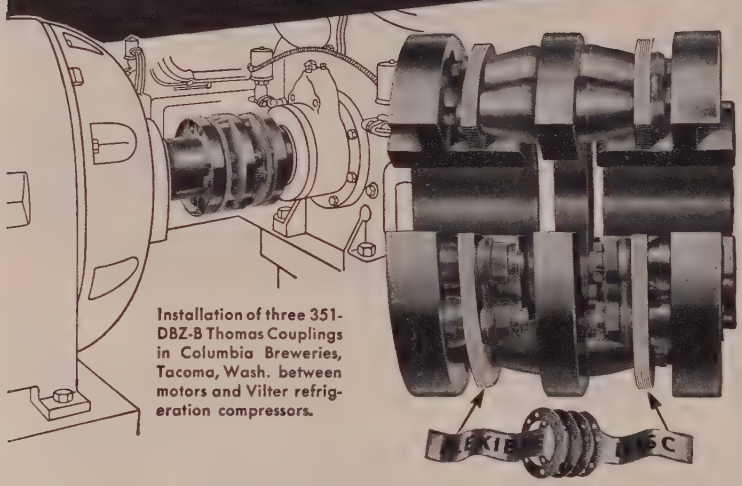
FOR MORE DATA CIRCLE NO. 17 ON REPLY CARD

Phone Holder

. . . holds while you talk

An electronic instrument, the Fonadek, makes it possible for yo-

THOMAS FLEXIBLE COUPLINGS...
for more years of better service!

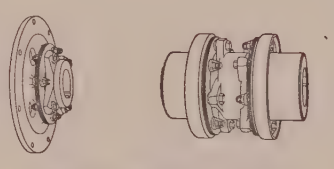


Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

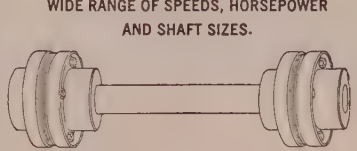
Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



THOMAS COUPLINGS ARE MADE FOR A WIDE RANGE OF SPEEDS, HORSEPOWER AND SHAFT SIZES.



Write for our new Engineering Catalog No. 51A

THOMAS

THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.

J&L Scrapless Nut Wire
helps close production gaps

Even with the best equipment and know-how, your scrapless nut production is only as good as the wire you use.

For smooth production that makes every minute count, you can rely on J&L scrapless nut wire. Quality controlled in every phase of manufacture, J&L scrapless nut wire gives you the best in—

- SURFACE QUALITIES
- WORKABILITY
- UNIFORMITY
- FINISH

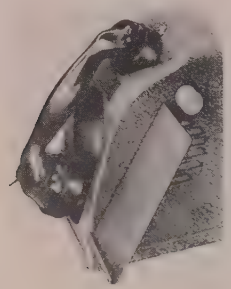
Down-time is costly—keep it to a minimum and boost your overall production of a better finished product with J&L scrapless nut wire. Remember—wherever you're located, you'll find the J&L representative near you can help show the way to fewer rejects, less die wear and less machine down-time. Call him today or write: Jones & Laughlin Steel Corporation, 3 Gateway Center, Pittsburgh 30, Pa.

Jones & Laughlin
STEEL CORPORATION — *Pittsburgh*

J&L STEEL

J&L SCRAPLESS NUT WIRE—TOPS IN QUALITY . . . COMPETITIVE IN PRICE

to talk on the phone without holding the receiver. Fonadek is a compact device which allows you to dial your call, place the telephone receiver on Fonadek and talk. Your hands are free. Your voice is transmitted clearly.



It needs no plugging in, no installation and runs on ordinary batteries. Volume can be regulated by a control button. Distributed by Fonadek Division, Special Devices Inc.

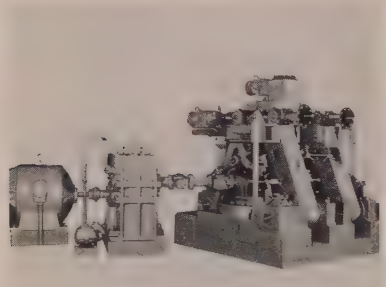
FOR MORE DATA CIRCLE NO. 18 ON REPLY CARD

Straightening Machine

. . . cluster-roll arrangement

The 2 MKTC guideless 7-roll straightening machine is designed for end-to-end straightening of 1¼-inch to 3¾-inch-OD tubes and bars from 1¼ to 3 inches in diameter.

A patented cluster-roll arrangement is employed in the pass line. A three-roll cluster, consisting of



a large driven roll with two opposed idler rolls, is located at the entry end of the machine. An identical cluster is at the delivery end.

Automatic roll adjustment, coordinated angling of all rolls and power operated adjusting screws, are featured. All controls accessible to a single operator. Sutton Engineering Co.

FOR MORE DATA CIRCLE NO. 19 ON REPLY CARD

FREE LITERATURE

Catalogs and Clip Sheets

Reply card on page 139 will bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue

Abrasives

Minnesota Mining & Mfg. Co.—"Weld Grinding and Blending with 3M Abrasives," a new 8-page booklet, describes use of coated abrasive discs and belts for weld removal. It gives detailed information on how users find unit costs reduced, production increased and quality of finish improved.

FOR MORE DATA CIRCLE NO. 20 ON REPLY CARD

Silicones

Dow Corning Corp.—A reference guide to Dow Corning silicone products is offered. Silicone fluids, abhesives, adhesives, release agents, compounds, greases, water repellents, protective coating resins, bonding resins, insulating varnishes, molding compounds, expansible resins, defoamers and the new silicone rubber are covered.

FOR MORE DATA CIRCLE NO. 21 ON REPLY CARD

Tool Shape Identification

Metal Removal Co.—A carbide and abrasive tool shape identification chart illustrates, in actual size, the various shapes of the company's mounted points. Carbide burr shapes are illustrated, with dimensions and prices listed for mounted points. Three tables present data on tap drills, twist drill and steel wire gage and decimal equivalents.

FOR MORE DATA CIRCLE NO. 22 ON REPLY CARD

Hydraulic Components

Hydraulic Press Mfg. Co. — HPM's new hydraulic components line is covered in a 28-page condensed catalog. The catalog is designed to serve as a comprehensive guide to four general parts classes. Profusely illustrated, it gives quick recognition of general specifications.

FOR MORE DATA CIRCLE NO. 23 ON REPLY CARD

Etching, Finishing Data

American Wheelabrator & Equipment Corp.—This company offers two bulletins one devoted to automatic and mechanical etching of steel mill rolls, the other on finishing forging dies by the wet blasting process. Diagrams in the first show mechanics of presenting the roll to the abrasive blast. The second, a 4-page bulletin, shows how wet blasting is done during the manufacture of a forging die to remove burrs and blend grinding lines and tool marks.

FOR MORE DATA CIRCLE NO. 24 ON REPLY CARD

Graphitization

Rockwell Mfg. Co.—A 12-page booklet discussing graphitization from standpoint of temperature, chemical composition, deoxidation practice, prewelding microstructure, welding conditions, post-welding heat treatment, stress and strain is offered by Edward Valves Inc., subsidiary of Rockwell. Photographs and drawings illustrate structural formations of steel and relations of various conditions to graphitization. Methods for correction are discussed.

FOR MORE DATA CIRCLE NO. 25 ON REPLY CARD

Hose Coupling

Titeflex Inc.—"Titeflex Quick-Seal Coupling," a 16-page booklet, describes simple construction of their connect-disconnect hose coupling and points out what this construction provides for the user. Single and double check valve modifications of this coupling and its accessories are listed.

FOR MORE DATA CIRCLE NO. 26 ON REPLY CARD

Screw Machines

New Britain Machine Co.—Precision Products Division offers a 14-page brochure covering its preci

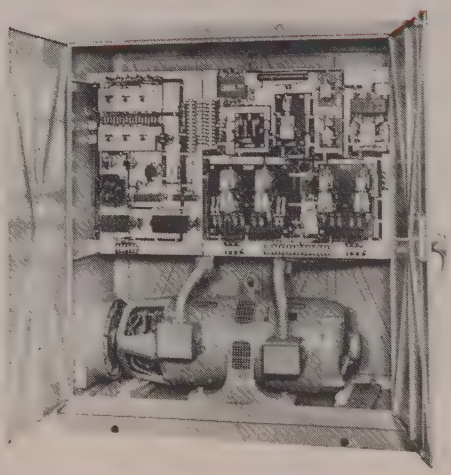
AL THE SPEED—CONTROL THE PROCESS

with a Performance Rated© Century

SELECTIVE SPEED DRIVE

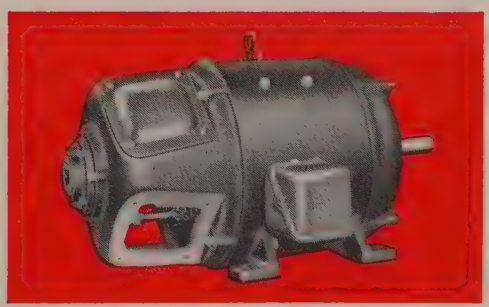
- **Offers automatic control integrated with your process.**
- **Covers a wide speed range—forward or reverse.**
- **Starts, stops—fast or slow.**
- **Allows forward or reverse jogs.**
- **Controls one or more motors.**

With a Century Performance Rated Selective Speed Drive, you can often integrate speed changes to cycle automatically as the process requirements dictate.



- You can automatically regulate metal cutting for optimum cutting speeds.
- Make the speed change automatically sensitive to changing temperature or pressure.
- Make the speed change automatically sensitive to changing diameter of a feed roll.
- Make the speed change automatically sensitive to the viscosity of a mix.
- You can use many different kinds of control devices in the control circuit to change speeds ... to jog ... to apply dynamic braking, etc.

You're welcome to full information on your specific drive problem. Call your nearest Century District Sales Office or Century Authorized Distributor, or write direct. See telephone listings.



Century makes A. C. and D. C. motors
⅛ to 400 H. P.

Century © MOTORS

CENTURY ELECTRIC COMPANY
1806 Pine Street, St. Louis 3, Missouri
Offices and Stock Points in Principal Cities

AIRCRAFT, ALLOY, STAINLESS CARBON STEELS

IN

FLATS · ROUNDS · SQUARES HEXAGONS · SPECIAL SHAPES & PROTOTYPE FORGINGS

	Thick	Wide	Long
FLATS	¼"	¾"-4"	8 ft.
	⅜"	½"-6"	10 ft.
	½"	⅝"-6"	10 ft.
	⅝"-⅞"	¾"-10"	12 ft.
	1"-1¼"	1⅛"-10"	12 ft.
	1⅜"-1¾"	1½"-10"	16 ft.
	1⅞"-3"	2"-12"	16 ft.
	3⅛"-5"	3¼"-16"	16 ft.

ROUNDS — ½"-12"

SQUARES — ½"-12"

HEXAGONS — ½"-5"

Max. Bar Wgt. 5000 lbs.
Max. Bar Lgt. 20 ft.

Ends Cold Sawed

All steel smooth forged to standard forging tolerances ★ Complete facilities in our own plant for rough turning and rough boring ★ Heat treating facilities for bars max. length 20 ft.

McINNES STEEL COMPANY

SINCE 1895

MILL: CORRY, PENNSYLVANIA

Offices in all principal cities

sion screw machines. A question and-answer section is devoted t significant facts about the Ne Britain division. Illustrations an brief descriptions cover kinds parts manufactured, facilities an precision production.

FOR MORE DATA CIRCLE NO. 27 ON REPLY CAR

Super Hammer

E. V. Nielsen Inc.—This com pany offers a 4-page, illustrate folder covering their Appton supe hammer. What it does in drillin chipping, trimming, etc., plus con trol and economy are covered. In cluded are snap application photo Tools and accessories are covere on the back page.

FOR MORE DATA CIRCLE NO. 28 ON REPLY CAR

Electric Heating

Westinghouse Electric Corp.— A 23-page booklet on electric heat ing units presents complete dat on heaters, thermostats and snap switches. Tables list wattage re quired, supply voltage and dimen sions. One section selects correct heater for a specific application.

FOR MORE DATA CIRCLE NO. 29 ON REPLY CARD

Alloy Castings

International Nickel Co. Inc.— Bulletin A-141, 48 pages, is intend ed for users and potential users o stainless and heat-resistant alloy in cast form. Typical compositions with applications, limitations and types of service for which they are suitable are discussed. 17 photographs illustrate industria applications. Charts and tables c composition list principal Alloy Casting Institute designations.

FOR MORE DATA CIRCLE NO. 30 ON REPLY CARD

Germanium Crystals

Sylvania Electric Products Inc.— "Industrial Uses for Germanium Crystals" is the title of a 42-page booklet devoted entirely to the crystals' industrial application. The four main chapters cover: Relays and relay applications; timing cir cuits; power supply applications applications to industrial instru mentation.

FOR MORE DATA CIRCLE NO. 31 ON REPLY CARD

Induction Motors

Reliance Electric & Engineering Co.—A 12-page bulletin helps in choosing Reliance squirrel cage in duction motors, both new and cur rent line, for applications rangin from 1 to 200 hp. Performanc

USE A CARD

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NEW PRODUCT INFORMATION

FORMATION ON ADVERTISED PRODUCTS

FREE EDITORIAL CLIP SHEETS

racteristics, construction fea-
s, dimensions, price and other
rmation essential in ordering
right motor are included.
MORE DATA CIRCLE NO. 32 ON REPLY CARD

rel Finishing

ueen Stove Works Inc.—Almco
sion has worked up a 51-page
hure covering their Supersheen
d-finishing method. Typical
allations, what it is, examples
he method in action, are cov-
. Detailed text is supported by
erous photographs.
MORE DATA CIRCLE NO. 33 ON REPLY CARD

rect Heating

ayley Blower Co.—A 24-page
log affords engineering and
ntenance departments valuable
dbook data on indirect heating.
Chinook principle of a pipe
in a pipe is explained. Included
tables of heater capacities, per-
nance curves, physical data,
ng dimensions, friction losses,
steam properties.
MORE DATA CIRCLE NO. 34 ON REPLY CARD

p Gages

effield Corp.—An illustrated
let covers use and care of both
and female Ramp gages for
critical analysis of compressed
cylinders and fittings. 57 pages
etailed text cover description,
ation, setting and care.
ORE DATA CIRCLE NO. 35 ON REPLY CARD

n Relieving Fixture

oyal Oak Tool & Machine Co.—
-page booklet covers in detail
universal form relieving fix-
How it adds to the life of
, improves cutting quality and
t of tools that can be form-
ved with the fixture are de-
ed and illustrated.
ORE DATA CIRCLE NO. 36 ON REPLY CARD

Magnetic Equipment

Eriez Mfg. Co.—A 36-page booklet is concerned with permanent nonelectric magnetic equipment designed for steel handling and conveying. An introductory chapter tells how this machinery can increase production and reduce downtime. Succeeding chapters deal with the application of the holding and conveying equipment.
FOR MORE DATA CIRCLE NO. 37 ON REPLY CARD

Micarta Plastic

Westinghouse Electric Corp.—A 50-page catalog on industrial Micarta plastic is a handbook from standpoint of technical information. The spiral-bound catalog covers all grades and forms in which Micarta is supplied and chemical, mechanical and electrical properties of each. Three sections cover laminated and molded types, plus machining data.
FOR MORE DATA CIRCLE NO. 38 ON REPLY CARD

Investment Casting

Hitchiner Mfg. Co.—An illustrated booklet, "Investment—For Economy, For Performance," tells the story of precision investment casting and its advantages and limitations. In the 12-page booklet, steps involved in the method are described and pictures show modern precision investment casting methods from precise building of dies to inspection.
FOR MORE DATA CIRCLE NO. 39 ON REPLY CARD

Tube Bending

Tube Form Inc.—An illustrated folder showing the various machines and operations in tube bending, swedging, flaring, beading, spinning, expanding and welding is offered by Tube Form. The folder takes the reader from planning

For free literature, editorial clips or more information on products described in this section, circle the corresponding number at left. Fill in box below for articles or advertisements not numbered.

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5	15	25	35	45	55	65	75	85
6	16	26	36	46	56	66	76	86
7	17	27	37	47	57	67	77	87
8	18	28	38	48	58	68	78	88
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board to tool room and through to the various specially designed automatic and semiautomatic machines and operations. It also shows many of the final fabricated tube forms in their intricate shapes, sizes and assemblies.

FOR MORE DATA CIRCLE NO. 40 ON REPLY CARD

Washers

H. K. Metal Craft Mfg. Co.—A 16-page booklet contains helpful information and pictures on manufacture and availability of metal and fiber washers, both standard and special. It contains useful data on general washer characteristics, tolerances and facilities for meeting individual requirements. Standard stock washers are listed.

FOR MORE DATA CIRCLE NO. 41 ON REPLY CARD

Heat Exchanger

Niagara Blower Co.—Niagara offers bulletin No. 120 which describes the operation of the Niagara Aero heat exchangers used in cooling or controlling temperatures of industrial liquids. It shows the operation of this equipment by means of diagrams and examples of application by installation photographs.

FOR MORE DATA CIRCLE NO. 42 ON REPLY CARD

Tri-Bit Tools

Weddell Tools Inc.—A catalog describing Weddell Tri-Bit tools includes data on speeds and feeds, grinding and maintenance, cutter mounting and specifications for tool layout purposes. Fly-wheel arbors and adaptors, boring tools, hollow mills and special tools are shown.

FOR MORE DATA CIRCLE NO. 43 ON REPLY CARD

Austenitic Pipe Specs

Stainless Welded Products Inc. —Copies of ASTM specification A358-52T, which establishes controls for heavy-walled austenitic welded pipe, are available. Important advantages of this specification to the designing engineer and industrial purchaser are highlighted.

FOR MORE DATA CIRCLE NO. 44 ON REPLY CARD

Steel-Shipping Container

Republic Steel Corp.—An 8¼ x 11-inch folder describes the Pressed Steel Division's Collaps-a-tainer. Catalog illustrations include the Collaps-a-tainer in various positions including assembled, se collapsed and stacked. Details bottom construction are shown

FOR MORE DATA CIRCLE NO. 45 ON REPLY C

EDITORIA REPRINTS

St. Lawrence Seaway

First in a series of three artic on the St. Lawrence River Seaw recently approved by Congress, t article appearing on page 65. is summation of the over-all propo tion. It gives present status of t project and discusses just what proposed and by whom, bac ground and history, and the pote tial for industry and trade of t Great Lakes Region when the 2 foot-deep channel is completed.

FOR MORE DATA CIRCLE NO. 46 ON REPLY CA

GAW—The Management Side

At STEEL's invitation, David McDonald outlined labor's case f GAW in the April 5 issue. No three management men, Herbe E. Markley, secretary, Timken Ro er Bearing Co.; George T. Fond vice president, Weirton Steel Co and Joseph T. Block, president. I land Steel Co., present the positi of management. Their viewpoin are set forth in the article on p. 5

FOR MORE DATA CIRCLE NO. 47 ON REPLY CA

Machine Tool Design

This article, "Design Your Ow Special Machine Tools," shows ho users are discovering that in man instances they can buy powe units and feeding devices and p them together more cheaply tha they can purchase special or sing purpose machines. The story, p. 96, deals with experiences Rockwell Mfg. Co. in this "do yourself" metalworking trend.

FOR MORE DATA CIRCLE NO. 48 ON REPLY CA

Hot Working Titanium

This is No. 3 in STEEL's five-pa series on titanium by Rem-Cr Titanium's C. I. Bradford. In th article, on p. 100, Mr. Bradfo says ability of titanium to be h worked with conventional steel m equipment has been largely r sponsible for the industry's ra growth. Rules are simple, tru readily understood by those ski in the art of metalworking.

FOR MORE DATA CIRCLE NO. 49 ON REPLY CA

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4	14	24	34	44	54	64	74	84
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STEEL

May 24, 1954

Market Outlook

TEEL INGOT production rose to 70 per cent f capacity in the last week, highest level re-orded since the first week of March.

This was a 2-point rise over the preceding veek and was due primarily to sharp increases n production in the Far West and in the Birm-ngham district. In the Far West, a strike was nded at the Fontana, Calif., works of Kaiser teel Corp. In the Birmingham area, some of he steelmaking facilities had been idle, and a ood many steelworkers had been on vacation.

WO IN A ROW—The 2-point rise in the veek ended May 23 followed a 1-point increase n the preceding week.

Most of the strengthening in ingot produc-ion stems from a widespread increase in de-nand from steel users who have lowered their teel inventories as far as they wish. Practically one of the upturn comes from protective buy-ng against a steelworkers' strike or U. S. inter-vention in Indo-China. Of the two, U. S. mili-ary intervention in Indo-China would be the nore likely to touch off a buying spree. A strike vould be of only minor duration, compared with var, and many steel users would feel their in-ventories would safely carry them over a labor lispute.

COVERS MOST PRODUCTS— The edging up n demand covers most steel products, although ll steel producers are not feeling the improve-ment equally. Specifications from makers of ight, consumer durables are slightly more umerous than they were, and a seasonal up-wing in tin plate, structurals and tubular goods s being felt, too. The increase in railroad car loadings is even being accompanied by a slight stir in demand from the railroads for steel.

STRONG POINT—Continuing to stand out as a product in strong demand is galvanized steel sheet. It is wanted for the government grain bin program, air-conditioning equipment and seasonal uses in the agricultural field. In the East, capacity on continuous galvanizing lines is filled through October.

STRETCHING OUT—Enameling sheets, used in stoves, sanitary ware, refrigerators and washing machines, are not only moving faster than they were but ordering covers a longer period; some orders are being placed now for August delivery. Low silicon sheets, used in fractional horsepower electric motors, are trending upward in demand.

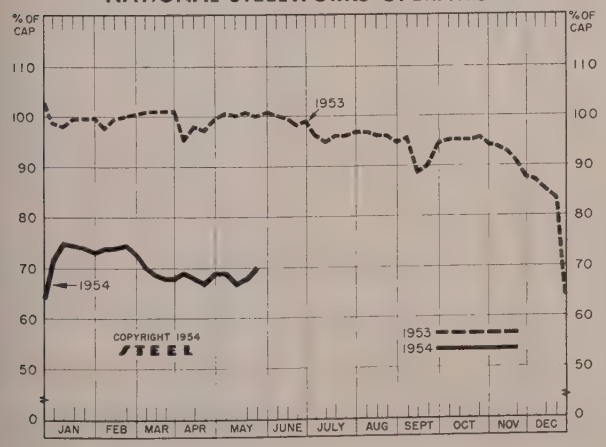
Not only are steel mills noticing a slight strengthening in demand for steel but so are warehouses.

EASY— Among products in lightest demand are hot-rolled and cold-finished bars, although they are not lagging quite as badly as they were.

Steel prices remain steady, holding STEEL's price composite on finished steel at $113.70 a net ton. Strengthening sentiment in the steel scrap market continues to push up prices, making STEEL's price composite on steelmaking scrap $28.33 a gross ton.

SIGN OF THE TIMES— In response to the scrap price rise, Inland Steel Co. put on an additional blast furnace at Indiana Harbor, Ind., last week. The company says that economics dictates an increase in the portion of hot pig iron used in steelmaking and a reduction in the amount of steel scrap.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended May 23	Change	Same Week 1953	Same Week 1952
Pittsburgh	70.5	— 0.5*	99	103.5
Chicago	81	— 2*	106	105
Mid-Atlantic	57	+ 1	97.5	94
Youngstown	68	0	105	105
Wheeling	82.5	— 1.5	101.5	97.5
Cleveland	71	— 7.5*	104.5	107
Buffalo	67.5	0	106.5	104
Birmingham	76	+20.5	101	102
New England	57	+ 7	85	70
Cincinnati	59.5	0	98.5	94.5
St. Louis	72.5	0	89.5	87
Detroit	65.5	+ 1	108	110
Western	74.5	+18.5	109	104
National Rate	70	+ 2	100	102

INGOT PRODUCTION‡

	Week Ended May 23	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	103.8†	105.2	101.8	140.1
NET TONS (In thousands)	1,668	1,690	1,636	2,250

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,384,549 in 1954; 2,254,459 in 1953; 2,077,040 in 1952.

Metalworking Outlook—p. 47

Technical Outlook—p. 95

PRICE INDEXES AND COMPOSITES

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics) Week Ended May 18

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, standard, No. 1	$4.400	Bars, H.R., alloy	$8.575	Strip, C.R., stainless, 430 (lb)	$0.415	Tin plate, hot-dipped, 1.25 lb	$8.43
Rails, light, 40 lb	5.767	Bars, H.R., stainless, 303 (lb)	0.418	Strip, H.R., carbon	4.963	Tin plate, electrolytic, 0.25 lb	7.12
Tie Plates	5.125	Bars, H.R., carbon	4.873	Pipe, black, buttweld (100 ft)	14.454	Black plate, can making quality	6.23
Axles, railway	7.250	Bars, reinforcing	4.900	Pipe, galv., buttweld (100 ft)	17.731	Wire, drawn, carbon	7.71
Wheels, freight car, 33 in. (per wheel)	47.000	Bars, C.F., carbon	7.960	Pipe, line (100 ft)	141.960	Wire, drawn, stainless, 430 (lb)	0.54
Plates, carbon	4.550	Bars, C.F., alloy	10.975	Casing, oil well, carbon (100 ft)	149.516	Bale ties (bundle)	5.65
Structural Shapes	4.367	Bars, C.F., stainless, 302 (lb)	0.433	Casing, oil well, alloy (100 ft)	214.113	Nails, wire, 8d common	7.48
Bars, tool steel, carbon (lb)	0.415	Sheets, H.R., carbon	4.755	Tubes, boiler (100 ft)	‡	Wire, barbed (80-rod spool)	6.84
Bars, tool steel, alloy, oil hardening die (lb)	0.505	Sheets, C.R., carbon	5.696	Tubing, mechanical, carbon (100 ft)	‡	Woven wire fence (20-rod roll)	16.17
Bars, tool steel, H.R., alloy, high speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.075	Sheets, galvanized	6.895	Tubing, mechanical, stainless, 304 (100 ft)	161.193	‡ Not available.	
Bars, tool steel, H.R., alloy, high speed W 18, Cr 4, V 1 (lb)	1.550	Sheets, C.R., stainless, 302 (lb)	0.548				
		Sheets, electrical	9.000				
		Strip, C.R., carbon	7.236				

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	May 18 1954	May 11 1954	Month Ago	Apr. Average
(1947-1949=100)	140.8	140.8	140.9	140.9

STEEL's FINISHED STEEL PRICE INDEX*

	May 19 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	189.74	189.74	189.74	181.31	154.01
Index in cents per lb	5.140	5.140	5.140	4.912	4.172

STEEL's ARITHMETICAL PRICE COMPOSITES

	May 19 1954	Week Ago	Month Ago	Year Ago	5 Yrs Ago
Finished Steel, NT*	$113.70	$113.70	$113.70	$110.98	$93.5
No. 2 Fdry, Pig Iron, GT	56.54	56.54	56.54	55.04	46.0
Basic Pig Iron, GT	56.04	56.04	56.04	54.66	45.6
Malleable Pig Iron, GT	57.27	57.27	57.27	55.77	47.2
Steelmaking Scrap, GT	28.33	27.67	26.00	39.00	21.8

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54 of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

COMPARISON OF PRICES

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	May 19 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.15	4.15	4.15	3.95	3.35
Bars, H.R., Chicago	4.15	4.15	4.15	3.95	3.35
Bars, H.R., del. Philadelphia	4.405	4.405	4.405	4.502	3.816
Bars, C.F., Pittsburgh	5.20	5.20	5.20	4.925	3.95
Shapes, Std., Pittsburgh	4.10	4.10	4.10	3.85	3.25
Shapes, Std., Chicago	4.10	4.10	4.10	3.85	3.25
Shapes, del., Philadelphia	4.38	4.38	4.38	4.13	3.492
Plates, Pittsburgh	4.10	4.10	4.10	3.90	3.40
Plates, Chicago	4.10	4.10	4.10	3.90	3.40
Plates, Coatesville, Pa.	4.10	4.10	4.10	4.35	3.50
Plates, Sparrows Point, Md.	4.10	4.10	4.10	3.90	3.45
Plates, Claymont, Del.	4.10	4.10	4.10	4.35	3.65
Sheets, H.R., Pittsburgh	3.925	3.925	3.925	3.775	3.25
Sheets, H.R., Chicago	3.925	3.925	3.925	3.775	3.25
Sheets, C.R., Pittsburgh	4.775	4.775	4.775	4.575	4.00
Sheets, C.R., Chicago	4.775	4.775	4.775	4.575	4.00
Sheets, C.R., Detroit	4.975	4.975	4.975	4.775	4.20
Sheets, Galv., Pittsburgh	5.275	5.275	5.275	5.075	4.40
Strip, H.R., Pitts.	4.425	4.425	4.425	3.975-4.225	3.275
Strip, H.R., Chicago	3.925	3.925	3.925	3.725	3.25
Strip, C.R., Pittsburgh	5.45	5.45	5.45	5.10-5.80	4.375
Strip, C.R., Chicago	5.70	5.70	5.70	5.35	4.00
Strip, C.R., Detroit	5.65	5.65	5.65	5.30-6.05	4.20
Wire, Basic, Pitts.	5.525	5.525	5.525	5.225-5.475	4.15
Nails, Wire, Pittsburgh	6.55	6.55	6.55	6.35	5.15
Tin plate (1.50 lb), box, Pitts.	$8.95	$8.95	$8.95	$8.95	$7.75
SEMIFINISHED STEEL					
Billets, forging, Pitts (NT)	$75.50	$75.50	$75.50	$70.50	$61.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	4.525	4.525	4.525	4.425	3.775

PIG IRON, Gross Ton	May 19 1954	Week Ago	Month Ago	Year Ago	5 Yrs Ago
Bessemer, Pitts.	$57.00	$57.00	$57.00	$55.50	$47.00
Basic, Valley	56.00	56.00	56.00	54.50	46.00
Basic, deld. Phila.	59.66	59.66	59.66	59.25	49.3
No. 2 Fdry, Pitts.	56.50	56.50	56.50	55.00	46.5
No. 2 Fdry, Chicago	56.50	56.50	56.50	55.00	46.2
No. 2 Fdry, Valley	56.50	56.50	56.50	55.00	46.5
No. 2 Fdry, del. Phila.	60.16	60.16	60.16	59.75	49.8
No. 2 Fdry, Birm.	52.88	52.88	52.88	51.38	39.3
No. 2 Fdry (Birm.) del. Cin.	60.43	60.43	60.43	58.93	45.4
Malleable, Valley	56.50	56.50	56.50	55.00	46.5
Malleable, Chicago	56.50	56.50	56.50	55.00	46.5
Ferromanganese, Duquesne	200.00†	200.00†	200.00†	200.00†	175.0

*75-82% Mn, gross ton, Etna, Pa. †74-76% Mn, net ton.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pitts.	$30.50	$29.50	$26.50	$39.50	$23.0
No. 1 Heavy Melt, E. Pa.	23.00	23.00	22.00	41.50	19.2
No. 1 Heavy Melt, Chicago	31.50	30.50	29.50	36.00	20.5
No. 2 Heavy Melt, Valley	29.50	29.50	27.50	41.50	22.0
No. 1 Heavy Melt, Cleve.	28.50	28.50	24.50	39.00	18.5
No. 1 Heavy Melt, Buffalo	25.50	25.50	23.50	41.75	22.2
Rails, Rerolling, Chicago	42.00	42.00	39.50	47.50	27.7
No. 1 Cast, Chicago	38.50	38.50	38.50	39.50	27.5
COKE, Net Ton					
Beehive, Furn, Connlsvl.	$14.75	$14.75	$14.75	$14.75	$14.2
Beehive, Fdry, Connlsvl.	16.75	16.75	16.75	17.00	16.7
Oven Fdry, Chicago	24.50	24.50	24.50	24.50	20.4

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots 21.50, pigs 20.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, .12% Si, 23.30; No. 13, 5% Si, 23.10; No. 142, 4% Cu, 24.40; No. 195, 4.5% Cu, 0.8% Si, 23.70; No. 214, 3.8% Mg, 24.40; No. 356, 7% Si, 0.3% Mg, 23.20.

Antimony: R.M.M. brand, 99.5% 28.50, Lone Star brand, 29.00, f.o.b. Laredo, Texas, in bulk. Foreign brands, 99.5%, 25.50-26.00 New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa.

Beryllium Copper: 3.75-4.25% Be, $40.00 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb del.

Cobalt: 97-99%, $2.60 per lb for 550 lb keg; $2.62 per lb for 100 lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $75.00 per lb. nom.

Copper: Electrolytic 30.00 del. Conn. Valley, 30.125 del. Midwest; Lake 30.00 del.; F refined 29.75 del.

Germanium: 99.9%, $295 per lb nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $145-$150 per troy oz.

Lead: Common 13.80, chemical 13.90, co roding 13.90, St. Louis; New York basis, ad 0.20.

Lithium: 98%, $11-$14 per lb, depending o quantity.

Magnesium: 99.8%, selfpalletizing pig 27.0 notched ingot 27.75, 10,000 lb or more, f.o Freeport, Tex. For Port Newark, N. J., an Madison, Ill., add 1.20 for pig and 1.25 f ingot. Sticks, 1.3 in. diameter, 46.00, 100 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, H, and R 32.50; alloy M 34.50, 10,000 lb or mo f.o.b. Freeport, Tex., or Madison, Ill. Ad 1.20 for Port Newark, N. J.

Mercury: Open market, spot, New Yor $260-$270 per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduc $3.40 per lb; pressed ingot $4.06 per l sintered ingot $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 i and larger), unpacked 60.00; 25-lb pigs 62.6 "XX" nickel shot 63.65; "F" nickel shot

DAILY NONFERROUS PRICE RECORD

	Price May 19	Last Change	Previous Price	Apr. Avg.	Mar. Avg.	May 1953 Avg.
Copper	30.00	Apr. 12	29.75–30.00	29.955	29.865	29.845
Lead	13.80	Apr. 12	13.55	13.710	12.735	12.550
Zinc	10.25	Mar. 29	9.75	10.250	9.657	11.000
Tin	93.75	May 19	93.50	96.260	92.518	97.240
Nickel	60.00	Jan. 14, 1953	56.50	60.000	60.000	60.000
Aluminum	21.50	July 15, 1953	20.50	21.500	21.500	20.500
Magnesium	27.00	Mar. 9, 1953	24.50	27.000	27.000	27.000

Quotations in cents per pound based on: Copper, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Nickel, electrolytic cathodes, 99.9%, base size at refinery unpacked; Aluminum, primary ingots, 99 + %, del.; Magnesium 99.8%, Freeport, Tex.

ts for addition to cast iron, 60.00; prices
). Port Colborne, Ont., including import
. New York basis, add 0.92.

dium: $140-$150 per troy oz nom.

adium: $21 per troy oz.

inum: $84-$87 per troy oz from refineries.

ium: $16-$21.50 per mg radium content,
ending on quantity.

dium: $125 per troy oz.

henium: $70-$75 per troy oz.

nium: 99.5%, $5-$6 per lb.

ium: 16.50, carlots; 17.00 l.c.l.

talum: Sheet, rod $39.00 per lb; powder
50 per lb.

urium: $1.75 per lb.

dium: $12.50 per lb.

: Straits, New York, spot, 93.75; prompt,
5.

anium: Sponge, 99.3+%, grade A-1 ductile
3% Fe max.) $4.72; grade A-2 (0.5% Fe
x.) $4.46 per pound.

gsten: Powder, 98.8%, carbon reduced,
0 lb lots $4.65 per lb f.o.b. shipping point;
than 1000 lb $4.80; 99+% hydrogen re-
ed, $4.95. Treated ingots $6.70.

c: Prime Western 10.25, brass special 10.50,
rmediate 10.75, E. St. Louis, freight al-
ed over 0.50 per pound. High grade 11.60,
cial high grade 11.75, die casting alloy
t 14.25, del.

conium: Sponge $10 per lb; powder elec-
nics grade $15, flash grade $11.50.

te: Chromium, manganese and silicon met-
are listed in ferroalloy section.)

ECONDARY METALS AND ALLOYS

minum Ingot: Piston Alloy 20.00-21.00;
12 foundry alloy (No. 2 grade) 19.75-
25; 5% silicon alloy, 0.60 Cu max., 22.50-
50; 13 alloy, 0.60 Cu max., 22.75-23.75;
alloy 21.50-22.00; 108 alloy 20.00-21.00;
el deoxidizing grades, notch bars, granu-
ed or shot: Grade 1, 20.50-21.00; grade 2,
00-19.50; grade 3, 18.25-18.75; grade 4,
00-18.00.

ss Ingot: Red brass, No. 115, 27.00; tin
nze No. 225, 39.00; No. 245, 33.25; high-
ded tin bronze, No. 305, 31.50; No. 1
low, No. 405, 23.25; manganese bronze No.
, 26.75.

gnesium Alloy Ingot: AZ63A, 31.50; AZ91B,
00; AZ91C, 31.50; AZ92A, 31.50.

NONFERROUS MILL PRODUCTS

COPPER WIRE

re, soft, f.o.b. eastern mills, 100,000 lb lots,
.36; 30,000 lb lots, 35.48; l.c.l. 35.98. Weath-
proof, 100,000 lb, 36.28; 30,000 lb, 36.53;
37.03. Magnet wire del., 15,000 lb or
re 41.83; l.c.l. 42.58.

LEAD

rices to jobbers f.o.b. Buffalo, Cleveland,
ttsburgh.) Sheets, full rolls, 140 sq ft or
re $19.00 per cwt; pipe, full coils $19.00
r cwt; traps and bends, list prices plus 30%.

TITANIUM

rices per lb, 100,000 lb and over, f.o.b. mill)
eets, $15; sheared mill plate, $12; strip, $15;
re, $11; forging billets, $6; hot-rolled and
ged bars, $6.

ZINC

eets 23.00, f.o.b. mill, 36,000 lb and over.
bbon zinc in coils, 19.50-20.50, f.o.b. mill,
000 lb and over. Plates 19.00-22.25.

ZIRCONIUM

ate $27; H.R. strip $28; C.R. strip $35;
ged or H.R. bars $27; wire, 0.015 in., 1
t per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
eet, C.R. ...	86.5	67.5	92.5
rip, C.R. ...	92.5	70.5	98.5
ate, H.R. ...	84.5	66.5	90.5
d, Shapes ..	82.5	65.5	88.5
amless Tubes	115.5	100.5	137.5
ot, Blocks ..	....	60.0	....

ALUMINUM

(30,000 lb base; freight allowed over 499 lb)
Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet*	Coiled Sheet	Coiled Sheet Circle†
0.249-0.136	12-49	33.9	...	...
0.135-0.096	12-48	34.4	...	...
0.095-0.077	12-48	35.1	32.7	37.5
0.076-0.061	12-48	35.7	32.9	37.7
0.060-0.048	12-48	36.1	33.2	38.1
0.047-0.038	12-48	36.6	33.6	38.4
0.037-0.030	12-48	37.0	34.0	39.1
0.029-0.024	12-48	37.6	34.3	39.6
0.023-0.019	12-36	38.3	35.1	40.4
0.018-0.017	12-36	39.1	35.7	41.3
0.016-0.015	12-36	40.0	36.5	42.5
0.014	12-24	41.0	37.5	43.8
0.013-0.012	12-24	42.1	38.2	44.8
0.011	12-24	43.1	39.4	46.4
0.010-0.0095	12-24	44.3	40.5	48.0
0.009-0.0085	12-24	45.6	41.9	50.0
0.008-0.0075	12-24	47.1	43.1	51.8
0.007	12-18	48.6	44.6	54.1
0.006	12-18	50.2	46.0	59.1

* 72-180 in. lengths, † 26 in. max. dia.

ALUMINUM

Plates and Circles: Thickness 0.250-3.0 in., 24-60 in. width or dia., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
2S-F, 3S-F	32.4	36.3
50S-F	33.5	37.4
4S-F	34.5	39.1
52S-F	36.2	40.9
61S-T6	37.4	41.5
24S-T4*	39.3	45.4
75S-T6*	47.1	53.7

* 24-48 in. widths or dia., 72-180 in. lengths.

ALUMINUM

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or across flats	——Round—— 11S-T3	17S-T4	—Hexagonal— 11S-T3	17S-T4
Drawn				
0.125	59.6	57.9	...	...
0.156-0.172	50.6	48.9	...	...
0.188	50.6	48.9	...	62.4
0.219-0.234	47.9	46.2	...	...
0.250-0.281	47.9	46.2	...	59.5
0.313	47.9	46.2	...	56.8
Cold-finished				
0.375-0.531	46.6	44.9	56.2	53.4
0.563-0.688	46.6	44.9	53.4	50.2
0.750-1.000	45.5	43.8	48.9	47.3
1.063	45.5	43.8	...	45.7
1.125-1.500	43.8	42.1	47.3	45.7
Rolled				
1.563	42.7	41.0	...	...
1.625-2.000	42.1	40.4	...	44.1
2.125-2.500	41.1	39.4	...	...
2.750-3.375	39.9	38.2	...	...

ALUMINUM

Forging Stock: Round, Class 1, 43.8-34.4, in specific lengths 36-144 in., diameters 0.375-8 in.; rectangles and squares. Class 1, 50.2-38.4 in random lengths 0.375-4.0 in. thick, widths 0.750-10.0 in.

Pipe: A.S.A. Schedule 40, alloy 63S-T6, 20 ft length, plain ends, 90,000 lb base, per 100 ft.

Nom. pipe size, in.		Nom. pipe size, in.	
¾	$15.05	2	$ 46.30
1	23.65	4	127.70
1¼	32.00	6	228.50
1½	38.25	8	343.80

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 94.00, 0.064-in. 73.00, 0.125-in. 60.00, 30,000 lb and over, f.o.b. mill.

Plate: Hot-rolled AZ31, 53.00, 20,000 lb or more 0.250-in. and over, widths to 48 in., lengths to 144 in.; raised pattern floor plate, 59.00, 20,000 lb or more, ¼-in. thick, widths 24-72 in., lengths 60-192 in.

Extrusion Stocks: AZ31, Rectangles, ¼ x 2 in. 69.20, 1 x 4 in. 63.00. Rod, 1 in. 66.00, 2 in. 62.50. Tubing, 1 in. OD x 0.065-in. 87.00. Angles, 1 x 1 x ⅛-in. 72.90, 2 x 2 x ¼-in. 67.00. Channels, 5 in. 67.80. I-Beams, 5 in. 66.20.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 2S clippings 13.00-13.50; low copper clippings 13.00-13.50; mixed clippings 11.00-11.50; old sheet 10.50-11.00; borings and turnings 6.50-7.00; pistons and struts 7.00-7.50; crankcases 10.50-11.00; industrial castings 10.50-11.00.

Copper and Brass: Heavy copper and wire, No. 1 24.50-25.00; No. 2 copper 23.00-23.50; light copper 21.00-21.50; No. 1 composition red brass 18.50-19.00; No. 1 composition turnings 17.75-18.25; mixed brass turnings 13.00; new brass clippings 18.00; No. 1 brass rod turnings 13.75-14.25; light brass 12.00; heavy yellow brass 13.75-14.25; new brass rod ends 15.25; auto radiators, unsweated 15.00; cocks and faucets 16.00-16.50; brass pipe 17.00.

Lead: Heavy 10.75-11.25; battery plate 5.75-6.25; linotype and stereotype 13.00; electrotype 11.25; mixed babbitt 12.75.

Magnesium: Clippings 18.50-19.50; clean castings 17.50-18.50; iron castings, not over 10% removable Fe, 16.50-17.50.

Monel: Clippings 24.00-26.00; old sheet 22.00-24.00; turnings 16.00-18.00; rods 23.00-25.00.

Nickel: Sheets and clips 60.00-65.00; rolled anodes 60.00-65.00; turnings 40.00; rod ends 60.00-65.00.

Tin: No. 1 pewter 55.00-60.00; block tin pipe 75.00-80.00; No. 1 babbitt 45.00-50.00.

Zinc: Old zinc, 4.50; new die cast scrap, 4.00; old die cast scrap, 3.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 2S, 3S clippings 15.00-15.50; 51S, 52S clippings 15.00-15.50; 14S, 17S, 24S clippings 13.50-14.00; mixed clippings 13.00-14.00; old sheet 12.00-13.00; old cast 12.00-13.00; clean old cable, free of steel 15.00-15.50; borings and turnings 12.50-13.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 42.00; light scrap 37.00.

Copper, Brass: No. 1 copper 27.00-27.25; No. 2 copper 25.50-25.75; light copper 24.00-24.25; refinery brass (60% copper) per dry copper content 22.50; auto radiators, 17.00-17.25.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper, Brass: No. 1 copper 27.00; No. 2 copper 25.50; light copper 24.00; No. 1 composition borings 20.50; No. 1 composition solids 21.50; heavy yellow brass solids 16.25-16.50; yellow brass turnings 15.00-15.25; radiators 17.00.

PLATING MATERIALS

(F.o.b. shipping points, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes $1.75 per lb.

Copper: Flat-rolled 45.04, oval 44.54, 2000-5000 lb; electrodeposited 39.78, cast 42.04, 5000-10,000 lb lots.

Nickel: Depolarized, less than 500 lb 92.00; 500-4999 lb 88.00; over 5000 lb 86.00.

Tin: Bar or slab, less than 200 lb $1.125; 200-499 lb $1.11; 500-999 lb $1.105; 1000 lb or more $1.10.

Zinc: Bar 18.50, bar or flat top 17.50, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100 lb drums.
Chromic Acid: Less than 10,000 lb 28.50; over 10,000 lb 27.50.

Copper Cyanide: Under 1000 lb 63.90, 1000 lb and over 61.90.

Copper Sulphate: 100-6000 lb 11.35; 6000-12,000 lb 11.10; 12,000-24,000 lb 10.85; 24,000-36,000 lb 10.60; 36,000 lb and over 10.35.

Nickel Chloride: 100 lb 45.00; 200 lb 43.00; 300 lb 42.00; 400-4900 lb 40.00; 5000-9900 lb 38.00; 10,000 lb and over 37.00.

Nickel Sulphate: 100 lb 37.00; 200 lb 35.00; 300 lb 34.00; 400-4900 lb 32.00; 5000-35,000 lb 30.00; 36,000 lb and over 29.00.

Silver Cyanide: Cents per ounce, 16 oz 80.625; 100 oz 78.50; 25,000 oz and over 77.325.

Sodium Cyanide: Egg, under 1000 lb 19.80; 1000-19,900 lb 18.80; 20,000 lb and over 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb 71.5; 100-600 lb 57.2; 700-1900 lb 54.7; 2000-9900 lb 53; 10,000 lb or more 51.9.

Stannous Chloride (Anhydrous): Less than 50 lb $1.576; 50 lb $1.236; 100-300 lb $1.086; 400-900 lb $1.061; 1000-1900 lb $1.037; 200-4900 lb $1; 5000-19,000 lb 93.9; 20,000 lb and over 87.8.

Stannous Sulphate: Less than 50 lb $1.275; 50 lb 97.5; 100-1900 lb 95.5; 2000 lb and over 93.5.

Zinc Cyanide: Under 1000 lb 54.30, 1000 lb and over 52.30.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
pper	48.38b	45.98c	....	48.44	26.000	26.000	25.250
llow Brass	41.72	33.50d	42.26	44.63	19.750	19.500	18.000
d Brass, 85%	45.44	45.38	45.98	48.25	23.000	22.750	22.250
w Brass, 80%	44.47	44.41	45.01	47.28	22.125	21.875	21.375
val Brass	45.76	40.07	52.80	48.92	18.250	18.000	17.500
mmercial Bronze, 90% ..	46.95	46.89	47.49	49.51	23.875	23.625	23.125
kel Silver, 10%	55.36	59.43g	57.69	....	23.625	23.375	11.813
osphor Bronze, A, 5% ..	66.58	67.08	67.08	68.23	26.125	25.875	24.875
icon Bronze	52.71	51.90	52.75	70.11e	25.125	24.875	24.125
nganese Bronze	49.48	43.62	54.06	....	18.250	18.000	17.500
ntz Metal	43.96	39.77	....	....	18.625	18.375	17.875

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 pounds, f.o.b. shipping nt. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

Nonferrous Metals

New refining process may expand industrial horizons for beryllium. Production cost would drop to about a third of present level

NEW industrial horizons may be opening up for beryllium, the versatile lightweight metal with heavyweight properties.

A new refining process, announced by Light Metals Refining Corp., New York, promises to reduce production cost per pound to about one-third its present level. Today beryllium lumps or beads (97 per cent) sell for $71.50, ingots $95-$115 per pound.

Other Metals Too? — The Sheer-Korman high intensity arc process "represents a new approach to the problem of chemical and metallurgical technology," says the company. Chief application lies in treatment of refractory ores such as beryl. The process may be adapted to refining of other metals including aluminum, magnesium and lithium, though the company's initial efforts will be confined to the refining of beryllium.

Here's how the refining process works. Raw beryl ore is mixed with about 30 per cent soft coal and formed into rod-shaped electrodes which are baked to impart electrical conductivity. Rods are consumed continuously in an arc furnace; the high intensity arc struck between two of the rods causes rapid vaporization of the material in an estimated temperature range of 15,000 to 20,000 degrees F—hotter than the sun's surface.

Chlorination—Ejected from the arc into the furnace atmosphere as a long, flaming jet at a speed of 100 miles per hour, the vapor is mixed with chlorine gas which converts metallic constituents of the ore quantitatively to their chlorides. Chloride vapors are then piped to a series of condensing chambers for fractional condensation.

In addition to pure beryllium chloride, sizable quantities of pure aluminum, iron and silicon chlorides are obtained. The beryllium chloride is electrolyzed directly to beryllium metal and to chlorine gas which is recirculated.

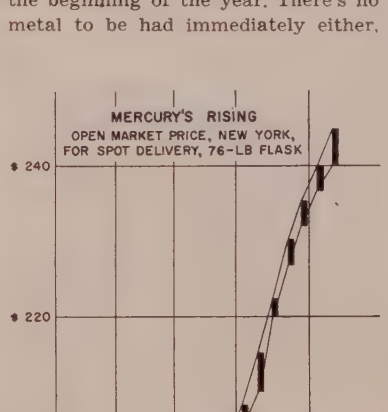
New Company—The process was perfected and in pilot plant stage at Maspeth, L. I., in 1949-50 under a grant from the Atomic Energy Commission. AEC subsequently withdrew, and Light Metals Refining Corp. was formed last October.

The company says the pilot plant has proved out and that a control plant with capacity of 10,000 pounds yearly will be in operation within a year. If it is successful and demand is sufficient, a production plant of 100,000-pounds annual capacity will be built.

Beryllium's Future — If the price comes down, beryllium applications will be far more common. The pure metal has established itself in x-ray work and as a moderator in nuclear processes. It has interesting possibilities for strengthening nickel or iron-base alloys, for protecting aluminum and magnesium alloys against oxidation. Its oxides are used in ceramics and industrial chemistry. Of all its alloys, beryllium copper enjoys the widest use and is produced in the greatest variety of compositions and forms. Lighter than all metals except magnesium, beryllium has high modulus of elasticity, high melting point and good resistance to corrosion.

Mercury: On a Price Spree

Mercury has shot through the top of its price thermometer to its highest point in more than a half-century. The ancient metal (quicksilver to producers, mercury to consumers) now commands as much as $260-$270 per 76-lb flask, up about $75 since the beginning of the year. There's no metal to be had immediately either,



and users are short, though condition of oversupply have generally prevailed over the last year.

Government buying abroad (barter deals with U. S. wheat for Spanish, Italian and Mexican mercury are repeatedly rumored but unconfirmed) and shipments behind the Iron Curtain are said to be causing the squeeze. Government stocks are ample, and users are pushing for release of the metal. Expensive domestic mines in the West may be pressed back into service. Mercury tanks are used for memory devices in electronic computers, control equipment, chemical processing, and a variety of industrial and agricultural products require the metal.

Exports Cause a Squeeze

Throttling the secondary copper market, exports of scrap are running close to three times last year's average. About 80 per cent of it has been going to Japan, but that nation's take has tapered in the last two months.

The competition for scrap forced brass ingotmakers to push prices up from a half-cent to one cent last week. The all-scrap grades took the full rise.

Market Memos

• Aluminum business is holding up higher in relation to 1953 than other industries, says D. Wilmot, vice president, Aluminum Co. of America. Shipments from distributors in the aggregate are higher than last year. Direct mill shipments are not, because of cutbacks by the military.

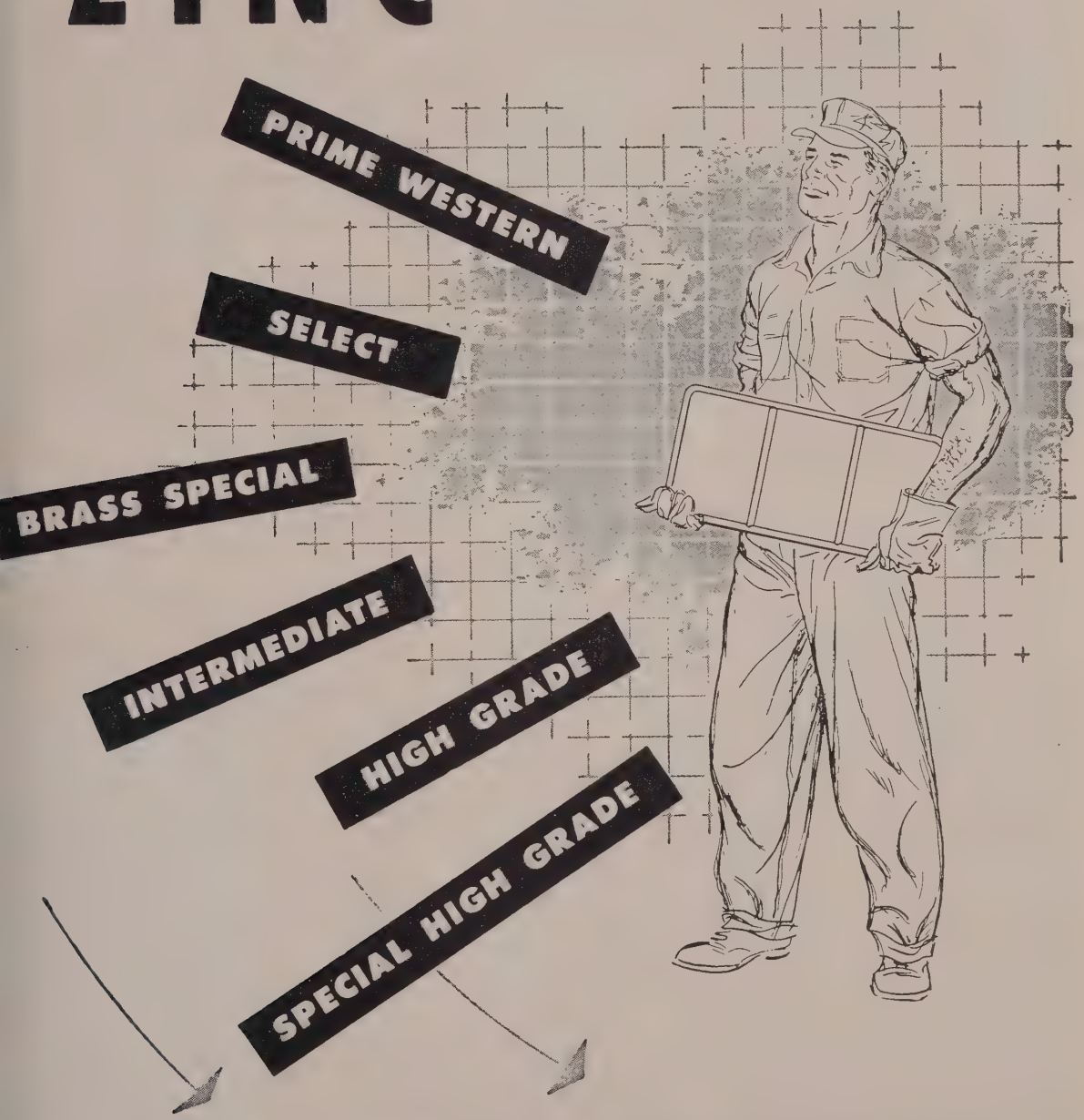
• What to do with the government tin smelter? RFC thinks it should be sold, GSA favors a long-term lease to private industry with rental figured on output. A bill favoring the former plan has been introduced in the House.

• April copper statistics show shipments to fabricators up 10 per cent from March and highest since December. Production was down 4 per cent and producers' refined stocks off 1 per cent. May promises to show further improvement.

• The U. S. may be self-sufficient in aluminum production facilities, but it's not in bauxite. Government figures show 73 per cent of U. S. bauxite supply last year was imported—[illegible] per cent of this from Dutch Guiana, 27 per cent from Jamaica (booming with bauxite development) and 2 per cent from British Guiana.

SLAB ZINC

every grade of ZINC
for urgent military and
civilian requirements



AMERICAN ZINC SALES COMPANY

Distributors for

AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, O. Chicago St. Louis New York

STEEL PRICES

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in *italics*.
Code numbers following mill points indicate producing company; key on page 147. Key to footnotes, page 149.

SEMIFINISHED

INGOTS, Carbon Forging (NT)
Fontana,Calif. K1 ....$86.00
Munhall,Pa. U5 .....59.00

INGOTS, Alloy (NT)
Detroit R7 .....$63.00
Fontana,Calif. K1 ....88.00
Midland,Pa. C18 .....62.00
Munhall,Pa. U5 .....62.00

BILLETS, BLOOMS & SLABS
Carbon Rerolling (NT)
Aliquippa,Pa. J5 ....$62.00
Bessemer,Pa. U5 .....62.00
Clairton,Pa. U5 .....62.00
Ensley,Ala. T2 .....62.00
Fairfield,Ala. T2 .....62.00
Fontana,Calif. K1 ....70.00
Gary,Ind. U5 .....62.00
Johnstown,Pa. B2 ....62.00
Lackawanna,N.Y. B2..62.00
Munhall,Pa. U5 .....62.00
So.Chicago,Ill. U5 ....62.00
So.Duquesne,Pa. U5 ..62.00

Carbon, Forging (NT)
Aliquippa,Pa. J5 .....$75.50
Bessemer,Pa. U5 .....75.50
Buffalo R2 .....75.50
Clairton,Pa. U5 .....75.50
Cleveland R2 .....75.50
Conshohocken,Pa. A3 ..80.50
Detroit R7 .....78.50
Ensley,Ala. T2 .....75.50
Fairfield,Ala. T2 .....75.50
Fontana,Calif. K1 ....83.50
Gary,Ind. U5 .....75.50
Geneva,Utah C11 ....75.50
Houston S5 .....83.50
Johnstown,Pa. B2 ....75.50
Lackawanna,N.Y. B2..75.50
LosAngeles B3 .....85.00
Munhall,Pa. U5 .....75.50
Seattle B3 .....89.00
So.Chicago R2,U5,W14.75.50
So.Duquesne,Pa. U5 ..75.50
So.SanFrancisco B3 ...85.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$82.00
Buffalo R2 .....82.00
Canton,O. R2, T7 ....82.00
Conshohocken,Pa. A3..89.00
Detroit R7 .....84.00
Fontana,Calif. K1 ....101.00
Gary,Ind. U5 .....82.00
Houston S5 .....90.00
Ind.Harbor,Ind. Y1 ...82.00
Johnstown,Pa. B2 ....82.00
Lackawanna,N.Y. B2 ..82.00
LosAngeles B3 .....102.00
Massillon,O. R2 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
So.Chicago R2,U5,W14.82.00
So.Duquesne,Pa. U5 ..82.00
Struthers,O. Y1 .....82.00
Warren,O. C17 .....82.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$92.50
Canton,O. R2 .....92.50
Cleveland R2 .....92.50
Fontana,Calif. K1 ....113.50
Gary,Ind. U5 .....92.50
Massillon,O. R2 .....92.50
So.Chicago,Ill. R2 ....92.50
So.Duquesne,Pa. U5 ..92.50

SHEET BAR (NT)
Fontana,Calif. K1 ...$93.18

SKELP
Aliquippa,Pa. J5 .....3.85
Munhall,Pa. U5 .....3.75
Warren,O. R2 .....3.75
Youngstown R2, U5 ....3.75

WIRE RODS
AlabamaCity,Ala. R2 ..4.525
Aliquippa,Pa. J5 ....4.525
Alton,Ill. L1 .....4.70
Buffalo W12 .....4.525
Cleveland A7 .....4.525
Donora,Pa. A7 .....4.525
Fairfield,Ala. T2 ....4.525
Fontana,Calif. K1 ....5.325
Houston S5 .....4.925
Johnstown,Pa. B2 ....4.525
Joliet,Ill. A7 .....4.525
KansasCity,Mo. S5 ....4.865
Kokomo,Ind. C16 ....4.625
LosAngeles B3 .....5.325
Minnequa,Colo. C10 ..4.775
Monessen,Pa. P7 ....4.525
No.Tonawanda,N.Y.B11 4.525
Pittsburg,Calif. C11 ..5.175
Portsmouth P12 .....4.525
Roebling,N.J. R5 ....4.625
So.Chicago,Ill. R2 ....4.525
SparrowsPoint,Md. B2..4.625
Sterling,Ill.(1) N15 ...4.525
Struthers,O. Y1 .....4.525
Torrance,Calif. C11 ...5.325
Worcester,Mass. A7 ...4.825

STRUCTURALS

Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ...4.10
Aliquippa,Pa. J5 .....4.10
Bessemer,Ala. T2 .....4.10
Bethlehem,Pa. B2 .....4.15
Clairton,Pa. U5 .....4.10
Fairfield,Ala. T2 .....4.10
Fontana,Calif. K1 ....4.75
Gary,Ind. U5 .....4.10
Geneva,Utah C11 .....4.10
Houston S5 .....4.50
Ind.Harbor,Ind. I-2 ....4.10
Johnstown,Pa. B2 ....4.15
KansasCity,Mo. S5 ....4.70
Lackawanna,N.Y. B2 ...4.15
LosAngeles B3 .....4.80
Minnequa,Colo. C10 ....4.55
Munhall,Pa. U5 .....4.10
Niles,Calif. P1 .....4.80
Phoenixville,Pa. P4 ....4.15
Seattle B3 .....4.85
So.Chicago,Ill. U5, W14.4.10
So.SanFrancisco B3 ....4.75
Torrance,Calif. C11 ....4.80
Weirton,W.Va. W6 ....4.10

Wide Flange
Bethlehem,Pa. B2 .....4.15
Clairton,Pa. U5 .....4.10
Fontana,Calif. K1 ....5.10
Lackawanna,N.Y. B2 ...4.15
Munhall,Pa. U5 .....4.10
Phoenixville,Pa. P4 ....4.15
So.Chicago,Ill. U5 ....4.10

Alloy Stand. Shapes
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 ....6.40
Gary,Ind. U5 .....5.00
Munhall,Pa. U5 .....5.00
So.Chicago,Ill. U5 ....5.00

H.S., L. A. Stand. Shapes
Aliquippa,Pa. J5 .....6.175
Bessemer,Ala. T2 ....6.175
Bethlehem,Pa. B2 ....6.20
Clairton,Pa. U5 .....6.175
Fairfield,Ala. T2 .....6.175
Fontana,Calif. K1 ....6.825
Gary,Ind. U5 .....6.175
Geneva,Utah C11 ....6.175
Ind.Harbor,Ind. I-2 ...6.175
Ind.Harbor,Ind. Y1 ...6.675
Johnstown,Pa. B2 .....6.20
Lackawanna,N.Y. B2 ...6.20
LosAngeles B3 .....6.85
Munhall,Pa. U5 .....6.175
Seattle B3 .....6.90
So.Chicago,Ill. U5,W14.6.175
So.SanFrancisco B3 ....6.80
Struthers,O. Y1 .....6.675

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....6.20
Lackawanna,N.Y. B2 ...6.20
Munhall,Pa. U5 .....6.125
So.Chicago,Ill. U5 ....6.125

PILING

Bearing Piles
Munhall,Pa. U5 .....4.10
So.Chicago,Ill. U5 ....4.10

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ...4.925
Lackawanna,N.Y. B2 ...4.925
Munhall,Pa. U5 .....4.925
So.Chicago,Ill. U5 ....4.925

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..4.10
Aliquippa,Pa. J5 .....4.10
Ashland,Ky. (15) A10 ..4.10
Bessemer,Ala. T2 .....4.10
Clairton,Pa. U5 .....4.10
Claymont,Del. C22 ....4.10
Cleveland J5, R2 .....4.10
Coatesville,Pa. L7 ....4.10
Conshohocken,Pa. A3 ..4.10
Ecorse,Mich. G5 .....4.25
Fairfield,Ala. T2 .....4.10
Fontana,Calif.(30) K1 ..4.75
Gary,Ind. U5 .....4.10
Geneva,Utah C11 .....4.10
GraniteCity,Ill. G4 ....4.30
Harrisburg,Pa. C5 ....4.10
Houston S5 .....4.50
Ind.Harbor,Ind. I-2, Y1.4.10
Johnstown,Pa. B2 ....4.10
Lackawanna,N.Y. B2 ...4.10
LoneStar,Tex. L6 .....4.40
Minnequa,Colo. C10 ....4.95
Munhall,Pa. U5 .....4.10
Pittsburgh J5 .....4.10
Riverdale,Ill. A1 .....4.10
Seattle B3 .....5.00
Sharon,Pa. S3 .....4.10
So.Chicago,Ill. U5, W14 4.10
SparrowsPoint,Md. B2 ..4.10
Steubenville,O. W10 ....4.10
Warren,O. R2 .....4.10
Weirton,W.Va. W6 ....4.10
Youngstown R2, U5, Y1.4.10

PLATES, Carbon Abras. Resist.
Fontana,Calif. K1 .....5.90
Geneva,Utah C11 .....5.25

PLATES, Wrought Iron
Economy,Pa. B14 .....9.30

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.25
Bessemer,Ala. T2 .....6.25
Clairton,Pa. U5 .....6.25
Cleveland J5 .....6.25
Conshohocken,Pa. A3 ..6.25
Ecorse,Mich. G5 .....6.40
Fairfield,Ala. T2 .....6.25
Fontana,Calif.(30) K1 ..6.95
Gary,Ind. U5 .....6.25
Geneva,Utah C11 .....6.25
Ind.Harbor,Ind. I-2 ...6.25
Ind.Harbor,Ind. Y1 ....6.75
Johnstown,Pa. B2 .....6.25
Lackawanna,N.Y. B2 ...6.25
Munhall,Pa. U5 .....6.25
Pittsburgh J5 .....6.25
Seattle B3 .....7.15
Sharon,Pa. S3 .....6.25
So.Chicago,Ill. U5, W14.6.25
SparrowsPoint,Md. B2 ..6.25
Youngstown U5 .....6.25
Youngstown Y1 .....6.75

PLATES, Alloy
Claymont,Del. C22 ....5.55
Coatesville,Pa. L7 .....5.55
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.55
Johnstown,Pa. B2 .....5.55
Munhall,Pa. U5 .....5.55
Sharon,Pa. S3 .....5.55
So.Chicago,Ill. U5, W14.5.55
SparrowsPoint,Md. B2 ..5.55

FLOOR PLATES
Cleveland J5 .....5.15
Conshohocken,Pa. A3 ...5.15
Harrisburg,Pa. C5 .....5.15
Ind.Harbor,Ind. I-2 ....5.15
Munhall,Pa. U5 .....5.15
So.Chicago,Ill. U5 .....5.15

PLATES, Ingot Iron
Ashland c.l. (15) A10 ..4.35
Ashland l.c.l.(15) A10..4.85
Cleveland c.l. R2 .....4.70
Warren,O. c.l. R2 .....4.70

BARS

BARS, Hot-Rolled Carbon
Aliquippa,Pa. J5 .....4.15
Alton,Ill. L1 .....4.35
Atlanta,Ga. A11 .....4.35
Bessemer,Ala. T2 .....4.15
Birmingham,Ala. C15 ..4.15
Buffalo(31) R2 .....4.18
Clairton,Pa. U5 .....4.15
Cleveland(31) R2 .....4.21
Detroit R7 .....4.30
Ecorse,Mich. G5 .....4.30
Emeryville,Calif. J7 ....4.90
Fairfield,Ala. T2 .....4.15
Fairless,Pa. U5 .....4.30
Fontana,Calif. K1 .....4.85
Gary,Ind. U5 .....4.15
Gadsden,Ala.(31) R2 ...4.18
Houston S5 .....4.55
Ind.Harbor,Ind. I-2, Y1.4.15
Johnstown,Pa. B2 .....4.15
KansasCity,Mo. S5 ....4.75
Lackawanna,N.Y. B2 ...4.15
LosAngeles B3 .....4.85
Milton,Pa. M18 .....4.15
Minnequa,Colo. C10 ....4.60
Niles,Calif. P1 .....4.85
N.Tonawanda,N.Y. B11.4.15
Pittsburg,Calif. C11 ....4.85
Pittsburgh J5 .....4.15
Portland,Oreg. O4 .....4.90
Seattle B3, N14, P23....4.90
So.Chicago U5, W14 ....4.15
Chicago(31) R2 .....4.22
So.Duquesne,Pa. U5 ....4.15
So.SanFran.,Calif. B3 ..4.90
Sterling,Ill. (1) N15 ...4.15
Struthers,O. Y1 .....4.15
Torrance,Calif. C11 ....4.85
Weirton,W.Va. W6 ....4.15
Youngstown U5 .....4.15
Youngstown(31) R2 ....4.20

Bars, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....4.875
Buffalo R2 .....4.875
Canton,O. R2, T7 ....4.875
Clairton,Pa. U5 .....4.875
Detroit R7 .....4.975
Ecorse,Mich. G5 .....5.025
Fairless,Pa. U5 .....5.025
Fontana,Calif. K1 ....5.925
Gary,Ind. U5 .....4.875
Houston S5 .....5.275
Ind.Harbor,Ind. I-2,Y1.4.875
Johnstown,Pa. B2 ....4.875
KansasCity,Mo. S5 ....5.475
Lackawanna,N.Y. B2 ..4.875
LosAngeles B3 .....5.925
Massillon,O. R2 .....4.875
Midland,Pa. C18 .....4.875
So.Chicago R2,U5,W14.4.875
So.Duquesne,Pa. U5 ...4.875
Struthers,O. Y1 .....4.875
Warren,O. C17 .....4.875
Youngstown U5 .....4.875

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.225
Bessemer,Ala. T2 ....6.225
Bethlehem,Pa. B2 ....6.225
Clairton,Pa. U5 .....6.225
Ecorse,Mich. G5 .....6.375
Fairfield,Ala. T2 .....6.225
Fontana,Calif. K1 ....7.475
Gary,Ind. U5 .....6.225
Ind.Harb.Ind. Y1 ....6.725
Ind.Harb.,Ind. I-2 ....6.225
Johnstown,Pa. B2 ....6.225
Lackawanna,N.Y. B2 ..6.225
LosAngeles B3 .....6.925
Pittsburgh J5 .....6.225
Seattle B3 .....6.975
So.Chicago W14 .....6.225
So.Duquesne,Pa. U5 ...6.225
So.SanFrancisco B3 ...6.975
Struthers,O. Y1 .....6.725
Youngstown U5 .....6.225

BAR SIZE ANGLES;H.R.CARBON
Bethlehem,Pa. B2 .....4.35

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....4.15
Atlanta A11 .....4.35
Niles,Calif. P1 .....4.85
SanFrancisco S7 .....5.10

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 ....5.925
Gary,Ind. U5 .....5.00
Houston S5 .....5.60
KansasCity S5 .....5.60
Youngstown U5 .....5.00

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 .....5.20
BeaverFalls,Pa. M12,R2.5.20
Buffalo B5 .....5.25
Camden,N.J. P13 .....5.65
Carnegie,Pa. C12 .....5.20
Chicago W18 .....5.20
Cleveland A7, C20 ....5.20
Detroit P17, R7 .....5.35
Detroit B5 .....5.40
Donora,Pa. A7 .....5.20
Elyria,O. W8 .....5.20
FranklinPark,Ill. N5 ..5.20
Gary,Ind. R2 .....5.20
GreenBay,Wis. F7 ....5.20
Hammond,Ind. L2, M13.5.20
Hartford,Conn. R2 .....5.75
Harvey,Ill. B5 .....5.20
LosAngeles R2, S30 ....6.65
Mansfield,Mass. B5 ....5.75
Massillon,O. R2, R8 ....5.20
Monaca,Pa. S17 .....5.20
Newark,N.J. W18 .....5.65
NewCastle,Pa.(17) B4 ..5.20
Pittsburgh J5 .....5.20
Plymouth,Mich. P5 ....5.45
Putnam,Conn. W18 .....5.75
Readville,Mass. C14 ....5.75
St.Louis,Mo. M5 .....5.50
So.Chicago,Ill. W14 ....5.20
SpringCity,Pa. K3 .....5.65
Struthers,O. Y1 .....5.20
Waukegan,Ill. A7 .....5.20
Worcester,Mass. W19 ...6.10
Youngstown F3, Y1 ....5.20

BARS, Cold-Finished Alloy (Turned and Ground)
Cumberland,Md.(5) C19.4.45

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....6.325
BeaverFalls,Pa. M12 ..6.325
Bethlehem,Pa. B2 ....6.325
Buffalo B5 .....6.325
Camden,N.J. P13 .....6.50
Canton,O. R2, T7 ....6.325
Carnegie,Pa. C12 .....6.32
Chicago W18 .....6.32
Cleveland A7, C20 ....6.32
Detroit R7 .....6.42
Detroit P17 .....6.41
Detroit B5 .....6.52
Donora,Pa. A7 .....6.32
Elyria,O. W8 .....6.32
Gary,Ind. R2 .....6.32
Hammond,Ind. L2,M13.6.32
Hartford,Conn. R2 ....6.77
Harvey,Ill. B5 .....6.32
Lackawanna,N.Y. B2 ..6.32
Mansfield,Mass. B5 ...6.77
Massillon,O. R2, R8 ...6.32
Midland,Pa. C18 .....6.32
Monaca,Pa. S17 .....6.32
Newark,N.J. W18 .....6.6
Plymouth,Mich. P5 ....6.52
So.Chicago,Ill. R2,W14.6.32
SpringCity,Pa. K3 .....6.5
Struthers,O. Y1 .....6.32
Warren,O. C17 .....6.32
Waukegan,Ill. A7 .....6.32
Worcester,Mass. A7 ...6.62
Youngstown F3, Y1 ...6.32

BARS, Reinforcing (Fabricators
AlabamaCity,Ala. R2 ...4.1
Atlanta A11 .....4.3
Birmingham,Ala. C15 ..4.1
Buffalo R2 .....4.1
Cleveland R2 .....4.1
Emeryville,Calif. J7 ....4.9
Fairfield,Ala. T2 .....4.1
Fairless,Pa. U5 .....4.3
Fontana,Calif. K1 .....4.8
Gary,Ind. U5 .....4.1
Houston S5 .....4.5
Ind.Harbor,Ind. I-2, Y1.4.1
Johnstown,Pa. B2 .....4.1
KansasCity,Mo. S5 ....4.7
Lackawanna,N.Y. B2 ...4.1
LosAngeles B3 .....4.8
Milton,Pa. M18 .....4.1
Minnequa,Colo. C10 ....4.7
Niles,Calif. P1 .....4.8
Pittsburg,Calif. C11 ....4.8
Pittsburgh J5 .....4.1
SandSprings,Okla. S5 ..5.0
Seattle B3, N14, P23...4.9
So.Chicago,Ill. R2 .....4.1
So.Duquesne,Pa. U5 ....4.1
So.SanFrancisco B3 ....4.9
SparrowsPoint,Md. B2 ..4.1
Sterling,Ill.(1) N15 ....4.1
Struthers,O. Y1 .....4.1
Torrance,Calif. C11 ....4.8
Youngstown R2, U5 ....4.1

BARS, Reinforcing (Fabricated; to consumers)
Johnstown, ¼-1" B2 ...5.5
KansasCity S5 .....6.3
LosAngeles B3 .....5.8
Marion,O. P11 .....5.5
Seattle N14 .....5.8
Seattle B3, P23 .....5.8
So.SanFrancisco B3 ....5.8
SparrowsPt. ½-1" B2 ..5.5
Williamsport,Pa. S19 ...5.4

RAIL STEEL BARS
Avis,Pa.(3) J8 .....4.2
ChicagoHts.(3) C2, I-2..4.0
ChicagoHts.(4) C2, I-2..4.1
Ft.Worth,Tex.(26) T4 ..4.0
Franklin,Pa.(3) F5 .....4.0
Franklin,Pa.(4) F5 .....4.1
Marion,O.(3) P11 .....4.0
Moline,Ill.(3) R2 .....4.1
Tonawanda(3,4) B12 ...4.1
Williamsport,Pa.(3) S19.4.1
Williamsport,Pa.(4) S19.5.1

BARS, Wrought Iron
Economy,Pa.(S.R.)B14 10.
Economy,Pa.(D.R.)B14 12.
Economy(Staybolt) B14 13.
McK.Rks.(S.R.) L5 ...10.
McK.Rks.(D.R.) L5 ...14.
McK.Rks.(Staybolt) L5.15.

SHEETS

SHEETS, Hot-Rolled Steel (18 gage and heavier)
AlabamaCity,Ala. R2 ..3.9
Allenport,Pa. P7 .....3.9
Ashland,Ky.(8) A10 ...3.9
Cleveland J5, R2 .....3.9
Conshohocken,Pa. A3 ..3.9
Detroit M1 .....4.0
Ecorse,Mich. G5 .....4.0
Fairfield,Ala. T2 .....3.9
Fairless,Pa. U5 .....3.9
Fontana,Calif. K1 .....4.
Gary,Ind. U5 .....3.9
Geneva,Utah C11 .....4.0
GraniteCity,Ill. G4 ....4.1
Ind.Harbor,Ind. I-2, Y1.3.9
Irvin,Pa. U5 .....3.9

:omo,Ind. C16 ....4.025
kawanna,N.Y. B2 .3.925
nhall,Pa. U5 .....3.925
rport,Ky. N9 .....3.925
s,O. N12 .....5.175
sburg,Calif. C11 ...4.625
sburgh J5 .....3.925
tsmouth,O. P12 ....3.925
erdale,Ill. A1 .....3.925
ron,Pa. S3 .....3.925
Chicago,Ill. W14 ...3.925
rrowsPoint,Md. B2.3.925
benville,O. W10 ...3.925
rance,Calif. C11 ...4.625
rren,O. R2 .....3.925
rton,W.Va. W6 ...3.925
ngstown U5, Y1 ...3.925

ETS H.R. (19 gage)
bamaCity,Ala. R2 .5.225
rer,O. R1 .....5.05
komo,Ind. C16 ....5.025
nsfield,O. E6 .....5.05
es,O. N12 .....4.775
rance,Calif. C11 ....5.875

ETS, H.R. (14 ga. heavier)
igh-Strength Low-Alloy
veland J5, R2 .....5.90
shohocken,Pa. A3 ..5.90
rse,Mich. G5 .....6.05
rfield,Ala. T2 .....5.90
rless,Pa. U5 .....5.95
tana,Calif. K1 ....6.675
y,Ind. U5 .....5.90
.Harbor,Ind. I-2 ....5.90
.Harbor,Ind. Y1 ....6.40
n,Pa. U5 .....5.90
kawanna(35) B2 ....5.90
nhall,Pa. U5 .....5.90
sburgh J5 .....5.90
rron,Pa. S3 .....5.90
Chicago,Ill. U5 .....5.90
rrowsPoint (36) B2 ..5.90
rren, O. R2 .....5.90
rton,W.Va. W6 ....5.90
ngstown U5 .....5.90
ngstown Y1 .....6.40

ETS, Hot-Rolled Ingot Iron
18 Gage and Heavier)
iland,Ky.(8) A10 ..4.175
veland R2 .....4.525
.Harbor,Ind. I-2 ..4.175
rren,O. R2 .....4.525

ETS, Cold-Rolled Steel
Commercial Quality)
enport,Pa. P7 .....4.775
veland J5, R2 .....4.775
rse,Mich. G5 .....4.925
rfield,Ala. T2 .....4.775
rless,Pa. U5 .....4.825
lansbee,W.Va. F4 ..4.775
tana,Calif. K1 ....5.875
y,Ind. U5 .....4.775
nitеCity,Ill. G4 ....4.975
.Harbor,Ind. I-2,Y1.4.775
in,Pa. U5 .....4.775
ckawanna,N.Y. B2..4.775
ldletown,O. A10 ....4.775
tsburg,Calif. C11 ...5.725
tsburgh J5 .....4.775
rtsmouth,O. P12 ....4.775
rrowsPoint,Md. B2..4.775
ubenville,O. W10 ...4.775
rren,O. R2 .....4.775
irton,W.Va. W6 ...4.775
ngstown Y1 .....4.775

ETS, Cold-Rolled
igh-Strength Low-Alloy
veland J5, R2 .....7.225
rse,Mich. G5 .....7.375
rless,Pa. U5 .....7.275
ntana,Calif. K1 ....8.275
y,Ind. U5 .....7.225
lianaHarbor,Ind. Y1.7.725
in,Pa. U5 .....7.225
ckawanna(37) B2 ..7.225
tsburgh J5 .....7.225
rrowsPoint (38) B2.7.225
rren,O. R2 .....7.225
irton,W.Va. W6 ...7.225
ngstown Y1 .....7.725

ETS, Cold-Rolled Ingot Iron
veland R2 .....5.375
ldletown,O. A10 ....5.275
rren,O. R2 .....5.375

ETS, Culvert	Cu Alloy	Cu Fe
iland,Ky. A10	.6.325	....
nton,O. R2	..6.075	6.675
rfield T2	....6.075	6.325
y,Ind. U5	..6.075	6.325
.Harbor I-2	..6.075	6.325
in,Pa. U5	...6.075	6.325
komo,Ind. C16.	6.175	....
rtinsFry.,O. W10	6.075	....
ts.,Calif. C11.	.6.825	....
rrowsPt. B2.	.6.075	....
rance,Cal. C11	7.075	....

ETS, Culvert	Pure Iron
iland,Ky. A10	....6.575
rfield,Ala. T2	.....6.325
rtinsFerry,O. W10.	.6.325

SHEETS, Gal'd No. 10 Steel
AlabamaCity,Ala. R2 ..5.275
Ashland,Ky(8) A10 ...5.275
Canton,O. R2 .....5.275
Delphos,O. N16 .....5.775
Dover,O. R1 .....5.275
Fairfield, Ala. T2 ....5.275†
Gary,Ind. U5 .....5.275†
GraniteCity, Ill. G4 ....5.475
Ind.Harbor,Ind. I-2 ...5.275
Irvin,Pa. U5 .....5.275†
Kokomo, Ind. C16 ....5.375†
MartinsFerry,O. W10..5.275
Niles,O. N12 .....5.275
Pittsburg,Calif. C11 ..6.025†
SparrowsPoint,Md. B2.5.275
Steubenville,O. W10 ..5.275
Torrance,Calif. C11 ..6.275†
Weirton,W.Va. W6 ....5.275†

† Based on 5c zinc

SHEETS, Galvanized No. 10 High-Strength Low-Alloy
Irvin,Pa. U5 .....7.925
SparrowsPoint(39) B2..8.075

SHEETS, Galvanized Ingot Iron No. 10 flat
Ashland,Ky. (8) A10 ..5.525
Canton,O. R2 .....6.025

SHEETS, Galvannealed Steel
Canton,O. R2 .....5.825
Irvin,Pa. U5 .....5.825†
Kokomo, Ind. C16 ....5.925†
Niles,O. N12 .....5.825

† Based on 5c zinc

SHEETS, ZINCGRIP Steel
Butler,Pa. A10 .....5.275
Middletown,O. A10 ....5.275

SHEETS, ZINCGRIP Ingot Iron
Butler,Pa. A10 .....5.575
Middletown,O. A10 ....5.575

SHEETS, Electrogalvanized
Cleveland R2 (28) 6.125
Niles,O. R2 (28) 6.125
Weirton,W.Va. W6 ....5.975

SHEETS, ALUMINIZED
Butler,Pa. A10 .....8.625

SHEETS, Enameling Iron
Ashland,Ky.(8) A10 ..5.175
Cleveland R2 .....5.175
Gary,Ind. U5 .....5.175
GraniteCity,Ill. G4 ....5.375
Ind.Harbor,Ind. I-2 ..5.175
Irvin,Pa. U5 .....5.175
Middletown,O. A10 ....5.175
Niles,O. N12 .....6.525
Youngstown Y1 .....5.175

BLUED STOCK, 29 ga.
Follansbee,W.Va. F4 ...7.20
Follansbee(23) F4 .....6.425
Yorkville,O. W10 .....7.20

SHEETS, Long Terne Steel (Commercial Quality)
BeechBott'm,W.Va.W10 5.675
Gary,Ind. U5 .....5.675
Mansfield,O. E6 .....5.675
Middletown,O. A10 ....5.675
Niles,O. N12 .....5.675
Weirton,W.Va. W6 ....5.675

SHEETS, Long Terne, Ingot Iron
Middletown,O. A10 ....6.075

SHEETS, Well Casing
Fontana,Calif. K1 ....6.20

STRIP

STRIP, Hot-Rolled Carbon
Ala.City,Ala.(27) R2 ..3.925
Allenport,Pa. P7 .....3.925
Alton,Ill. L1 .....4.10
Ashland,Ky.(8) A10 ..3.925
Atlanta A11 .....4.125
Bessemer,Ala. T2 .....3.925
Birmingham C15 .....3.925
Bridgeport,Conn.(10)S15 3.95
Buffalo(27) R2 .....3.925
Carnegie,Pa. S18 .....4.425
Conshohocken,Pa. A3 ..4.05
Detroit M1 .....4.075
Ecorse,Mich. G5 .....4.075
Fairfield,Ala. T2 ....3.925
Fontana,Calif. K1 ....4.70
Gary,Ind. U5 .....3.925
Houston,Tex. S5 .....4.325
Ind.Harbor,Ind. I-2,Y1.3.925
Johnstown,Pa.(25) B2..3.925
KansasCity,Mo.(9) S5 .4.525
Lackw'na,N.Y.(25) B2.3.925
LosAngeles(25) B3 ....4.675
Milton,Pa. M18 .....3.925
Minnequa,Colo. C10 ....5.025
NewBritain(10) S15 ....4.15
N.Tonawanda,N.Y. B11.3.925
Pittsburg,Calif. C11 ..4.675
Portsmouth,O. P12 ....3.925
Riverdale,Ill. A1 .....3.925
SanFrancisco S7 .....5.10
Seattle(25) B3, P23 ..4.925
Seattle N14 .....4.925
Sharon,Pa. S3 .....3.925
So.Chicago,Ill. W14 ...3.925
So.SanFrancisco(25)B3 4.675
SparrowsPoint,Md. B2.3.925
Torrance,Calif. C11 ....4.675
Warren,O. R2 .....3.925
Weirton,W.Va. W6 ....3.925
Youngstown U5 .....3.925

STRIP, Hot-Rolled Alloy
Bridgeport,Conn.(10)S15 6.45
Carnegie,Pa. S18 .....6.40
Fontana,Calif. K1 ....7.80
Gary,Ind. U5 .....6.40
Houston,Tex. S5 .....6.80
KansasCity,Mo. S5 ....7.00
LosAngeles B3 .....7.60
NewBritn.,Conn.(10)S15 6.45
Sharon,Pa. S3 .....6.40
So.Chicago W14 .....6.40
Youngstown U5 .....6.40

STRIP, Hot-Rolled High-Strength Low-Alloy
Bessemer,Ala. T2 .....5.95
Conshohocken,Pa. A3 ..5.90
Ecorse,Mich. G5 .....6.10
Fairfield,Ala. T2 .....5.95
Fontana,Calif. K1 .....7.05
Gary,Ind. U5 .....5.95
Ind.Harbor,Ind. I-2 ....5.95
Ind.Harbor,Ind. Y1 ....6.45
Lackawanna,N.Y. B2 ..6.00
LosAngeles(25) B3 ....6.70
Seattle(25) B3, P23 ..6.95
Sharon,Pa. S3 .....5.95
So.SanFrancisco(25) B3.6.70
SparrowsPoint,Md. B2 ..6.00
Warren,O. R2 .....5.95
Weirton,W.Va. W6 ....5.95
Youngstown Y1 .....6.45
Youngstown U5 .....5.95

STRIP, Hot-Rolled Ingot Iron
Ashland,Ky.(8) A10 ..4.175
Warren,O. R2 .....4.525

STRIP, Cold-Rolled Carbon
Anderson,Ind. G5 .....5.45
Baltimore T6 .....5.60
Bridgeport,Conn.(10) S15.5.45
Cleveland A7, J5 ....5.45
Dearborn,Mich. D3 ....5.60
Detroit M1 .....5.60
Detroit D2, P20 .....5.65
Dover,O. G6 .....5.45
Ecorse,Mich. G5 .....5.60
Follansbee,W.Va. F4 ..5.45
Fontana,Calif. K1 .....7.35
FranklinPark,Ill. T6 ...5.70
Ind.Harbor,Ind. I-2 ....5.70
Indianapolis C8 .....5.60
Lackawanna,N.Y. B2 ..5.45
LosAngeles C1 .....7.50
Mattapan,Mass. T6 ....6.10
Middletown,O. A10 ....5.45
NewBedford,Mass. R10..6.00
NewBritain(10) S15 ...5.45
NewCastle,Pa. B4, E5..5.45
NewHaven,Conn. A7 ...6.20
NewHaven,Conn. D2 ...5.90
Pawtucket,R.I. N8, R3..6.10
Pittsburgh J5 .....5.45
Riverdale,Ill. A1 .....5.70
Rome,N.Y.(32) R6 ....5.45
Sharon,Pa. S3 .....5.45
SparrowsPoint,Md. B2..5.45
Trenton,N.J. R5 .....7.00
Wall'ford,Conn. W2 ....5.90
Warren,O.(40) T5 ....5.45
Warren,O. B9, R2 ....5.45
Weirton,W.Va. W6 ....5.45
Worcester,Mass. A7 ....6.30
Youngstown C8, Y1 ....5.45

STRIP, Cold-Rolled Alloy Steel
Carnegie,Pa. S18 .....12.00
Cleveland A7 .....12.00
Dover,O. G6 .....12.00
Fontana,Calif. K1 ....13.65
Harrison,N.J. C18 ....12.00
Pawtucket,R.I.(11) N8.12.15
Pawtucket,R.I.(12) N8.12.45
Sharon,Pa. S3 .....12.00
Worcester,Mass. A7 ..12.30
Youngstown C8 .....12.00

STRIP, Cold-Rolled High-Strength Low-Alloy
Cleveland J5 .....7.80
Cleveland A7 .....8.15
Dearborn,Mich. D3 ....7.90
Dover,O. G6 .....8.00
Ecorse,Mich. G5 .....8.30
Lackawanna,N.Y. B2 ..8.15
Pittsburgh J5 .....7.80
Sharon,Pa. S3 .....7.65
SparrowsPoint,Md. B2..8.15
Warren,O. R2 .....7.60
Weirton,W.Va. W6 ....8.15
Youngstown Y1 .....8.30

STRIP, Cold-Rolled Ingot Iron
Warren,O. R2 .....6.05

STRIP, Electrogalvanized
Dover,O. G6 .....5.45
Warren,O. B9, T5 .....5.45
Weirton,W.Va. W6 ....5.45
Youngstown C8 .....5.70

TIGHT COOPERAGE HOOP
Atlanta A11 .....4.65
Riverdale,Ill. A1 .....4.50
Sharon,Pa. S3 .....4.35
Youngstown U5 .....4.35

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke,Wickwire Spencer Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Div. H. K. Porter Co. Inc.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Products
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel&Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M16 Md. Fine & Special Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott

N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Nrthwst.Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg.Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P20 Prod. Steel Strip Corp.
P23 Pacific Steel Rolling

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg.Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S25 Stainless Welded Products
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg.Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	5.60	7.95	8.90	10.85	13.15
Bridgeport,Conn.(10) S15	5.45	7.65	8.60	10.55	12.85
Bristol,Conn. W1	...	...	8.90	10.85	....
Carnegie,Pa. S18	...	7.65	8.60	10.55	12.85
Cleveland A7	5.45	7.65	8.60	10.55	12.85
Cleveland,O. C7	...	8.00	8.60	10.55	12.85
Dearborn,Mich. D3	5.60	7.85	8.80	....	....
Detroit D2	5.65	7.85	8.80	10.55	....
Dover,O. G6	5.45	7.65	8.60	10.55	12.85
FranklinPark,Ill. T6	5.70	7.80	8.75	10.70	13.00
Harrison,N. J. C18	...	...	8.90	10.85	13.15
Indianapolis C8	...	7.80	8.60	10.55	....
Mattapan,Mass. T6	6.10	7.95	8.90	10.85	13.15
NewBritn.,Conn.(10) S15	5.75	7.65	8.60	10.55	12.85
NewCastle,Pa. B4	5.45	7.65	8.60	....	....
NewCastle,Pa. E5	5.45	8.00	8.60	10.55	12.85
NewHaven,Conn. D2	5.90	7.95	8.90	10.85	....
NewYork W3	...	7.95	8.90	10.85	13.15
Pawtucket,R.I.(11) N8	...	7.65	8.60	10.55	12.85
Pawtucket,R.I.(12) N8	6.10	7.95	8.90	10.85	13.15
Sharon,Pa. S3	5.45	7.65	8.60	10.55	12.85
Trenton,N.J. R5	...	7.95	8.90	10.85	13.15
Wallingford,Conn. W2	5.90	7.95	8.90	10.85	13.15
Warren,O. T5	5.45	7.65	8.60	10.55	12.85
Weirton,W.Va. W6	5.45	7.65	8.60	10.55	12.85
Worcester,Mass. A7	6.30	7.95	8.90	10.85	13.15
Worcester,Mass. T6	6.10	7.95	8.90	10.85	13.15
Youngstown C8	...	7.65	8.60	10.55	12.85
Spring Steel (Tempered)					
Buffalo W12	...	...	12.50	....	....
Bristol,Conn. W1	...	...	12.50	15.00	....
FranklinPark,Ill. T6	...	...	13.25	15.75	18.75
Harrison,N.J. C18	...	...	12.50	15.00	18.00
NewYork W3	...	...	12.50	15.00	18.00
Trenton,N.J. R5	...	...	12.50	15.00	18.00
Worcester,Mass. T6	...	...	12.50	15.00	18.00
Worcester,Mass. W12	...	...	12.50	....	....
Youngstown C8	...	...	12.85	15.35	18.35

SILICON STEEL

H.R. SHEETS (22 gage) (Cut Lengths)	Field	Armature	Electric Motor		Dynamo
BeechBottom,W.Va. W10	...	...	8.75	9.75	10.65
Brackenridge,Pa. A4	...	...	8.75	9.75	10.65
IndianaHarbor,Ind. I-2	7.85	8.15	8.75	9.75	....
Mansfield,O. E6	7.85	8.15	8.75	9.75	10.65
Newport,Ky. N9	7.85	8.15	8.75	9.75	10.65
Niles,O. N12	7.85	8.15	8.75	9.75	....
Vandergrift,Pa. U5	...	8.15	8.75	9.75	10.65
Warren,O. R2	7.85	8.15	8.75	9.75	....
Zanesville,O. A10	...	8.15	8.75	9.75	10.65

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric Motor		Dynamo
GraniteCity,Ill. G4	8.25*	8.60*	9.20*	10.20*	....
IndianaHarbor,Ind. I-2	8.05	8.40*	9.00*	....	....
Vandergrift,Pa. U5	8.05*	8.90	9.50	10.50	11.40
Warren,O. R2	8.05†	8.90	9.50	10.50	11.40

H.R. SHEETS (22 Gage) (Cut Lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	11.60	12.15	12.65	13.65
Brackenridge,Pa. A4	11.60	....	....	....
Newport,Ky. N9	11.60	....	....	....
Vandergrift,Pa. U5	11.60	12.15	12.65	13.65
Zanesville,O. A10	11.60	12.15	12.65	13.65

C.R. COILS & CUT LENGTHS (22 Ga.)	T-100	T-90	T-80	T-73	T-72
Butler,Pa. A10	....	....	16.25	16.75	....
Vandergrift,Pa. U5	13.65	14.65	16.25	16.75	12.35‡
Warren,O. R2	....	....	....	....	12.35‡

* Semiprocessed. † Fully processed only. ‡ Coils annealed; semiprocessed ½c lower.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.40	$7.65	$8.05
Fairfield,Ala. T2	7.50	7.75	8.15
Fairless,Pa. U5	7.50	7.75	8.15
Gary,Ind. U5	7.40	7.65	8.05
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.40	7.65	8.05
Irvin,Pa. U5	7.40	7.65	8.05
Niles,O. R2	7.40	7.65	8.05
Pittsburg,Calif. C11	8.15	8.40	8.80
SparrowsPoint,Md. B2	7.50	7.75	8.15
Weirton,W.Va. W6	7.40	7.65	8.05
Yorkville,O. W10	7.40	7.65	8.05

TIN PLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.70	$8.95
Fairfield,Ala. T2	8.80	9.05
Fairless,Pa. U5	8.80	9.05
Gary,Ind. U5	8.70	8.95
Ind.Har. I-2, Y1	8.70	8.95
Irvin,Pa. U5	8.70	8.95
Pitts.,Cal. C11	9.45	9.70
Sp.Pt.,Md. B2	8.80	9.05
Warren,O. R2	8.70	8.95
Weirton,W.Va. W6	8.70	8.95
Yorkville,O. W10	8.70	8.95

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.50
Fairfield,Ala. T2	6.60
Fairless,Pa. U5	6.60
Gary,Ind. U5	6.50
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2, Y1	6.50
Irvin,Pa. U5	6.50
Niles,O. R2	6.50
Pittsburg,Calif. C11	7.25
SparrowsPoint,Md. B2	6.60
Warren,O. R2	6.50
Weirton,W.Va. W6	6.50
Yorkville,O. W10	6.50

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	6.10
Gary,Ind. U5	6.10
GraniteCity,Ill. G4	6.30
Ind.Harbor,Ind. Y1	6.10
Irvin,Pa. U5	6.10
Yorkville,O. W10	6.10

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.85
Gary,Ind. U5	7.75
Irvin,Pa. U5	7.75
Yorkville,O. W10	7.75

MANUFACTURING TERNES, 8 lb (Commercial Quality)

Gary,Ind. U5	$9.75
Yorkville,O. W10	9.75

MANUFACTURING TERNES, LT. Coated, 6 lb

Yorkville,O. W10	$8.65

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.75

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	5.525
Aliquippa,Pa. J5	5.525
Alton,Ill. L1	5.70
Atlanta A11	5.725
Bartonville,Ill. K4	5.625
Buffalo W12	5.525
Chicago W13	5.525
Cleveland A7, C20, R2	5.525
Crawfordsville,Ind. M8	5.625
Donora,Pa. A7	5.525
Duluth,Minn. A7	5.525
Fairfield,Ala. T2	5.525
Fostoria,O. (24) S1	5.75
Houston S5	5.925
Jacksonville,Fla. M8	6.05
Johnstown,Pa. B2	5.525
Joliet,Ill. A7	5.525
KansasCity,Mo. S5	6.125
Kokomo,Ind. C16	5.625
LosAngeles B3	6.475
Minnequa,Colo. C10	5.775
Monessen,Pa. P7	5.525
No.Tonawanda B11	5.525
Palmer,Mass. W12	5.825
Pittsburg,Calif. C11	6.475
Portsmouth,O. P12	5.525
Rankin,Pa. A7	5.525
So.Chicago,Ill. R2	5.525
So.SanFrancisco C10	6.475
SparrowsPoint,Md. B2	5.625
Sterling,Ill.(1) N15	5.525
Struthers,O. Y1	5.525
Waukegan,Ill. A7	5.525
Worcester,Mass. A7	5.825

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	6.925
Alton,Ill. L1	7.10
Bartonville,Ill. K4	7.025
Buffalo W12	6.925
Cleveland A7	6.925
Donora,Pa. A7	6.925
Duluth,Minn. A7	6.925
Fostoria,O. S1	6.925
Johnstown,Pa. B2	6.925
LosAngeles B3	7.875
Millbury,Mass.(12) N6	7.225
Minnequa,Colo. C10	7.175
Monessen,Pa. P7, P16	6.925
Muncie,Ind. I-7	7.125
Palmer,Mass. W12	7.225
Pittsburg,Calif. C11	7.875
Portsmouth,O. P12	6.925
Roebling,N.J. R5	7.225
So.Chicago,Ill. R2	6.925
So.SanFran. C10	7.875
SparrowsPt.,Md. B2	7.025
Struthers,O. Y1	6.925
Trenton,N.J. A7	7.225
Waukegan,Ill. A7	6.925
Worcester A7, J4	7.225
Worcester T6, W12	7.225

WIRE, Upholstery Spring

Aliquippa,Pa. J5	6.625
Alton,Ill. L1	6.80
Buffalo W12	6.625
Cleveland A7	6.625
Donora,Pa. A7	6.625
Duluth,Minn. A7	6.625
Johnstown,Pa. B2	6.625
LosAngeles B3	7.575
Minnequa,Colo. C10	6.80
Monessen,Pa. P7, P16	6.625
NewHaven,Conn. A7	6.925
Palmer,Mass. W12	6.925
Pittsburg,Calif. C11	7.575
Portsmouth,O. P12	6.625
Roebling,N.J. R5	6.925
So.Chicago,Ill. R2	6.625
So.SanFrancisco C10	7.575
SparrowsPoint,Md. B2	6.725
Trenton,N.J. A7	6.925
Waukegan,Ill. A7	6.625
Worcester,Mass. A7	6.925

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	10.75
Bartonville,Ill. K4	10.65
Buffalo W12	10.55
Chicago W13	10.55
Cleveland A7	10.55
Crawfordsville,Ind. M8	10.65
Fostoria,O. S1	10.55
Jacksonville,Fla. M8	11.08
Johnstown,Pa. B2	10.55
Kokomo,Ind. C16	10.55
Minnequa,Colo. C10	10.30
Monessen,Pa. P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.85
Roebling,N.J. R5	10.85
So.SanFrancisco C10	10.90
Waukegan,Ill. A7	10.55
Worcester,Mass. A7,T6	10.85

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	9.50
Buffalo W12	9.50
Johnstown,Pa. B2	9.50
Minnequa,Colo. C10	9.625
Monessen,Pa. P16	9.50
Muncie,Ind. I-7	9.70
Portsmouth,O. D2	9.50
Roebling,N.J. R5	9.80
SparrowsPt.,Md. B2	9.60

ROPE WIRE (A)

Alton,Ill. L1	9.45
Bartonville,Ill. K4	9.35
Buffalo W12	9.35
Fostoria,O. S1	9.35
Johnstown,Pa. B2	9.35
Monessen,Pa. P7, P16	9.35
Muncie,Ind. I-7	9.55
Palmer,Mass. W12	9.65
Portsmouth,O. P12	9.35
Roebling,N.J. R5	9.65
SparrowsPt. B2	9.45
Struthers,O. Y1	9.35
Worcester J4, T6	9.65

(A) Plow and Mild Plow; add 0.25c for improved plow.

WIRE, Tire Bead

Alton,Ill. L1	12.75
Bartonville,Ill. K4	12.65
Monessen,Pa. P16	12.55
Roebling,N.J. R5	12.85

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	7.45
Baltimore T6	7.75
Buffalo W12	7.45
Cleveland A7	7.45
Crawfordsville,Ind. M8	7.55
Dover,O. G6	7.45
Fostoria,O. S1	7.45
Kokomo,Ind. C16	7.55
FranklinPark,Ill. T6	7.60
Massillon,O. R8	7.45
Monessen,Pa. P7, P16	7.45
Pawtkt.,R.I.(12) N8	7.75
Trenton,N.J. R5	7.75
Worcester A7, T6, W12	7.75

WIRE, Merchant Quality (6 to 8 gage)	An'ld. Galv.
Ala.City R2	6.675 7.075**
Aliquippa J5	6.675 7.20*
Atlanta A11	6.775 7.30
Bartonville(48)K4	6.775 7.30
Buffalo W12	6.675 7.075†
Cleveland A7	6.675 ....
Crawfordsville M8	6.775 7.30
Donora,Pa. A7,	6.675 7.075†
Duluth,Minn. A7	6.675 7.075†
Fairfield T2	6.675 7.075†
Houston,Tex. S5	7.075 7.475
Jacksonville,Fla. M8	7.20 7.73
JohnstownB2(48)	6.675 7.225*
Joliet,Ill. A7	6.675 7.075†
KansasCity,Mo. S5	7.275 7.675
Kokomo C16	6.775 7.175†
LosAngeles B3	7.625 ....
Minnequa C10	6.925 7.325**
Monessen P7(48)	6.675 7.225
Palmer W12	6.975 7.375†
Pitts.,Calif. C11	7.625 8.025†
Portsmouth,O. P12	6.675 ....
Rankin A7	6.675 7.075†
So.Chi'go R2	6.675 7.075**
S.S.Frn.(48) C10	7.625 8.025**
Spar'wsPt. B2(48)	6.775 7.325*
Sterl'g(1)(48) N15	6.675 7.20
Struthers,O. Y1	6.675 7.175
Worcester A7	6.975 ....

* Based on 10c zinc; † 5c zinc; ** Subject to zinc equalization extras.

WOVEN FENCE, 9-15½ Ga. Col.

Ala.City,Ala. R2	140**
Ala.City, 17 ga. R2	235**
Ala.City, 18 ga. R2	245**
Aliq'ppa,Pa. 9-14½ga. J5	143*
Atlanta A11	145
Bartonville,Ill. K4	145
Crawfordsville,Ind. M8	145
Donora,Pa. A7	140†
Duluth,Minn. A7	140†
Fairfield,Ala. T2	140†
Houston,Tex. S5	148
Johnstown,Pa. B2	143
Johnstown 17 ga.,6"B2	234
Johnstown 4" B2	237
Joliet,Ill. A7	140†
KansasCity,Mo. S5	152
Kokomo,Ind. C16	142†
Minnequa,Colo. C10	148**
Monessen,Pa. 9 ga. P7	145
Pittsburg,Calif. C11	163†
Rankin,Pa. A7	140†
So.Chicago,Ill. R2	140**
Sterling,Ill. (1) N15	143

† Based on 5c zinc; * 11c zinc; ** Subject to zinc equalization extras.

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	149
Atlanta A11	151
Bartonville,Ill. K4	151
Crawfordsville,Ind. M8	151
Donora,Pa. A7	149
Duluth,Minn. A7	149
Fairfield,Ala. T2	149
Joliet,Ill. A7	149
KansasCity,Mo. S5	161
Kokomo,Ind. C16	151
Minnequa,Colo. C10	154
Pittsburg,Calif. C11	173
So.Chicago,Ill. R2	149
So.SanFran.,Calif. C10	17
SparrowsPoint,Md. B2	15
Sterling,Ill.(1) N15	14

WIRE, Barbed

	Co
AlabamaCity R2	153*
Aliquippa J5	150
Atlanta A11	15
Bartonville,Ill. K4	15
Crawfordsville,Ind. M8	15
Donora,Pa. A7	153
Duluth,Minn. A7	153
Fairfield,Ala. T2	15
Houston,Tex. S5	18
Johnstown,Pa. B2	15
Joliet,Ill. A7	15
KansasCity,Mo. S5	16
Kokomo,Ind. C16	15
Minnequa,Colo. C10	159
Monessen,Pa. P7	15
Pittsburg,Calif. C11	17
Rankin,Pa. A7	15
So.Chicago,Ill. R2	153
S.SanFrancisco C10	176
SparrowsPoint,Md. B2	15
Sterling,Ill. (1) N15	1

† Based on 5c zinc; * 1 zinc; ** Subject to zi equalization extras.

WIRE (16 gage) Stone	An'ld. Gal Sto
Ala.City R2	12.50 14.05
Aliquippa J5	12.50 14.3
Bartonville K4	12.60 14
Buffalo W12	12.50
Cleveland A7	12.50
CrawfordsvilleM8	12.50 14
Fostoria,O. S1	12.60 14.
Johnstown B2	12.50 14.3
Kokomo C16	12.60 14.1
Minnequa C10	12.75 14.4
Palmer,Mas.W12	12.50 14.0
Pitts.,Calif. C11	12.85 14.4
SparrowsPt. B2	12.60 14.4
Sterling(1) N15	12.50 14
Waukegan A7	12.50 14.0
Worcester A7	12.80

* Based on 11c zinc; † zinc; ** Subject to zi equalization extras.

NAILS, Stock

To dealers & mfrs. (7)	C
AlabamaCity,Ala. R2	
Aliquippa,Pa. J5	
Atlanta A11	
Bartonville,Ill. K4	
Chicago,Ill. W13	
Cleveland A9	
Crawfordsville,Ind. M8	
Donora,Pa. A7	
Duluth,Minn. A7	
Fairfield,Ala. T2	
Galveston,Tex. D7	
Houston,Tex. S5	
Johnstown,Pa. B2	
Joliet,Ill. A7	
KansasCity,Mo. S5	
Kokomo,Ind. C16	
Minnequa,Colo. C10	
Monessen,Pa. P7	
Pittsburg,Calif. C11	
Rankin,Pa. A7	
So.Chicago,Ill. R2	
SparrowsPt.,Md. B2	
Sterling,Ill. (1) N15	
Worcester,Mass. A7	

NAILS, CUT (100 lb keg) To dealers (33)

Conshohocken,Pa.	A3. $
Wheeling,W.Va.	W10

STAPLES, Polished Stock To dealers & mfrs. (7)

AlabamaCity,Ala. R2	
Aliquippa,Pa. J5	
Atlanta A11	
Bartonville,Ill. K4	
Crawfordsville,Ind. M8	
Donora,Pa. A7	
Duluth,Minn. A7	
Fairfield,Ala. T2	
Johnstown,Pa. B2	
Joliet,Ill. A7	
Kokomo,Ind. C16	
Minnequa,Colo. C10	
Monessen,Pa. P7	
Pittsburg,Calif. C11	
Rankin,Pa. A7	
So.Chicago,Ill. R2	
SparrowsPt.,Md. B2	
Sterling,Ill. (1) N15	
Worcester,Mass. A7	

FENCE POSTS

ChicagoHts.,Ill. C2	I-2.
Duluth,Minn. A7	(49)
Franklin,Pa. F5	
Johnstown,Pa. B2	
Marion,O. P11	
Minnequa,Colo. C10	
Moline,Ill. R2	
So.Chicago,Ill. R2	
Tonawanda,N.Y. B12	
Williamsport,Pa. S19	

MLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

—Inches	2		2½		3		3½		4		5		6	
Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
ds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
ippa, Pa. J5 (‡)....	15.75	list	19.75	2.5	22.25	5	23.75	6.5	23.75	6.5	23	5.75	25.5	8.25
ridge, Pa. N2 (†)...	15.75	...	19.75	...	22.25	...	23.75	...	23.75	...	23	...	25.5	....
in, O. N3 (*)	15.75	4.5	19.75	5.5	22.25	8	23.75	9.5	23.75	9.5	23	8.75	25.5	11.25
gstown Y1 (††)	15.75	list	19.75	2.5	22.25	5	23.75	6.5	23.75	6.5	23	5.75	25.5	8.25

CTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

gstown R2 (**)	15.75	1.5	19.75	3.5	22.25	6.0	23.75	7.5	23.75	7.5	23	7.5	25.5	6.75

TWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

—Inches	⅛		¼		⅜		½		¾		1		1¼		1½	
Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c		27.5c	
ds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28		2.73	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
ippa, Pa. J5 (‡)....	...	...	....	...	....	....	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
n, Ill. L1 (§)	...	...	....	...	....	....	24.25	9	27.25	13	29.75	16.5	32.25	17.5	32.75	18.25
wood, W. Va. W10(††)	25.5	+0.25	17.75	+5.5	10.25	+10	26.25	11	29.25	15	31.75	18.5	34.25	19.5	34.75	20.25
er, Pa. F6	26.5	—1.75	19.5	+2.75	12.5	+6.25	...	...	...	...	...	...	....	....	....	....
., Pa. N2 (†)	...	...	....	...	....	....	26.25	7	29.25	11	31.75	14.5	34.25	16.25	34.75	17.25
less, Pa. N3	...	...	....	...	....	....	24.25	..	27.25	..	29.75	...	32.25	....	32.75	....
ana, Calif. K1 (§) ..	...	...	....	...	....	....	13.25	+3	16.25	1	18.75	4.5	21.25	5.5	21.75	6.5
Harbor Y1 (††)	...	...	....	...	....	....	25.25	9	28.25	13	30.75	16.5	33.25	17.5	33.75	18.5
in, O. N3 (*)	...	...	....	...	....	....	26.25	16	29.25	20	31.75	23.5	34.25	23	34.75	24
on, Pa. S4 (‡)	26.5	-0.25	19.50	+4.25	12.5	+8.5	....	..	....	..	....	..	....	....	....	....
on, Pa. M6	...	...	....	...	....	....	26.25	11	29.25	15	31.75	18.5	34.25	19.25	34.75	20.25
rows Pt., Md. B2 (§)	24.5	+1.75	17.5	+6.25	10.5	+10.5	24.25	8	27.25	12	29.75	15.5	32.25	16.5	32.75	17.5
gstown R2 (**)	...	...	....	...	....	....	26.25	12	29.25	16	31.75	19.5	34.25	20.0	34.75	21.0
gstown Y1 (††)	...	...	....	...	....	....	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
atland, Pa. W9 (§)..	24.5	+1.75	17.5	+6.25	10.5	+10.5	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5

—Inches	2		2½		3		3½		4	
Per Ft	37c		58.5c		76.5c		92c		$1.09	
ds Per Ft	3.68		5.82		7.62		9.20		10.89	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
ippa, Pa. J5 (‡) ...	35.25	20	36.75	20	36.75	20	....	....	....	....
n, Ill. L1 (§)	33.25	18.75	34.75	18	34.75	18	....	....	....	....
wood, W.Va. W10(††)	35.25	20.75	36.75	20.5	36.75	20.5	27.75	11	27.75	11
, Pa. N2 (†)	35.25	17.25	36.75	18.5	36.75	18.5	27.75	9	27.75	9
less, Pa. N3	33.25	....	34.75	....	34.75	...	25.75	....	25.75	....
ana, Calif. K1 (§)..	22.25	7	23.75	7	23.75	7	....	....	....	....
Harbor, Ind. Y1 (††)	34.25	19	35.75	19	35.75	19	....	....	....	....
in, O. N3 (*)	35.25	24.5	36.75	23	36.75	23	....	....	....	....
on, Pa. M6	35.25	20.75	36.75	20.5	36.75	20.5	....	....	....	....
rows Pt., Md. B2 (§)	32.25	18	34.75	18	34.75	18	25.75	8.5	25.75	8.5
gstown R2 (**)	35.25	21.5	36.75	21.0	36.75	21.0	27.75	11.5	27.75	11.5
gstown Y1 (††)	35.25	20	36.75	20	36.75	20	....	....	....	....
atland, Pa. W9 (‡)..	35.25	20	36.75	20	36.75	20	....	....	....	....

Galvanized pipe discounts based on zinc price of: (†), 14c; (‡), 11c to under 12c; (*), 5c; (§), 10c to under 11c; 10.50c-11.50c; (**), 9.50c; with discounts adjusted on price of zinc at time of shipment.

LER TUBES

base c.l. prices, dollar per 100 ft, mill; minimum thickness, cut length 10 to 24 ft, inclusive.

B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
..... 13	....	19.02	18.44
..... 13	....	22.53	18.12
..... 13	20.65	24.91	20.01
..... 13	24.40	29.43	23.66
..... 13	27.34	32.98	26.51
..... 13	30.80	37.15	29.86
..... 12	33.43	40.32	32.41
..... 12	36.82	44.41	35.70
..... 12	39.87	48.09	38.66
..... 12	42.52	51.28	41.23

ILWAY MATERIALS

	Std. No. 1	Std. No. 2	All No. 2	Tee Rails 60 lb Under
S				
emer, Pa. U5	4.325	4.225	4.275	5.20
ley, Ala. T2	4.325	4.225	....	5.20
field, Ala. T2	....	....	....	5.20
y, Ind. U5	4.325	4.225	4.275	...
ington, W.Va. W7	....	....	....	5.20
anaHarbor, Ind. I-2 ...	4.325	4.225	4.275	...
stown, Pa. B2	....	....	...(16)	5.20
kawanna, N.Y. B2	4.325	4.225	....	5.20
nequa, Colo. C10	4.325	4.225	....	5.70
lton, Pa. B2	4.325	4.225	....	...
mamsport, Pa. S19	....	....	....	5.20

T PLATES

field, Ala. T2	5.125
y, Ind. U5	5.125
Harbor, Ind. I-2	5.125
kawanna, N.Y. B2	5.125
nequa, Colo. C10	5.125
sburg, Calif. C11	5.275
tle B3	5.275
lton, Pa. B2	5.125
rance, Calif. C11	5.275

CK BOLTS (20) Treated

veland R2	11.00
sasCity, Mo. S5	11.00
anon, Pa. B2	11.00
nequa, Colo. C10	11.00
sburgh O3, P14	11.00
ttle, Wash. B3	11.50

NT BARS

semer, Pa. U5	5.275
field, Ala. T2	5.275
Harbor, Ind. I-2	5.275
et, Ill. U5	5.275
kawanna, N.Y. B2	5.275
nequa, Colo. C10	5.275
lton, Pa. B2	5.275

ES

Harbor, Ind. S13	6.50
nstown, Pa. B2	6.50

STANDARD TRACK SPIKES

Fairfield, Ala. T2	7.05
Ind. Harbor, Ind. I-2, Y1	7.05
Kansas City, Mo. S5	7.30
Lebanon, Pa. B2	7.05
Minnequa, Colo. C10	7.05
Pittsburgh J5	7.05
Seattle B3	7.55
So. Chicago, Ill. R2	7.05
Struthers, O. Y1	7.05
Youngstown R2	7.05

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 8.90c
⅜-in. under .....26.5 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..... List

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants, per cent off list for less than case lots to consumers)

6 in. and shorter:
½-in. & smaller diam. 4
⅝-in. & ⅝-in. 5
¾-in. and larger 3
Longer than 6 in.:
All diams. ..... +4
Lag bolts, all diams.:
6 in. and shorter.... 12
Over 6 in. long 8
Ribbed Necked Carriage 5
Blank 25
Plow 25
Step, Elevator, Tap and Sleigh Shoe 12
Tire Bolts ..... List
Boiler & Fitting-Up Bolts 23

NUTS

H.P. & C.P., regular & heavy:
Square, all sizes 58
H.P., Hex, regular & heavy:
¾" and smaller 58
⅞" to 1⅛", inclusive. 60
1¼" to 1½", inclusive 62
1⅝" and larger 58
C.P. Hex regular & heavy:
All sizes 58
Hot Galv. Nuts (all types):
¾" and smaller 40
⅞" to 1½", inclusive. 43
Finished Hex Nuts:
New standard, all sizes 58
Semifinished & Slotted Hex:
Regular and heavy, all sizes 58

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter 34
1 in. and smaller diam. x over 6 in. 20

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller 34
¼ in. diam & larger.... 14
N.F. thread, all diams.. 8

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish .....47.5 x 10
Plated finishes .....30 x 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:
⅝-in. & smaller 38
¾-in. through 1 in. .. 22
Longer than 6 in.:
⅝-in. and smaller ... 20
¾-in. through 1 in. .. 7

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

Sponge Iron: Cents
98+% Fe, annealed. 18.00
Unannealed
Minus 100 mesh .. 14.50
Minus 35 mesh .. 10.50
Minus 20 mesh .. 10.00
Swedish, c.l.f. N. Y., c.l., in bags 11.25
Domestic (Swedish), f.o.b. Riverton, N. J., in bags.... 11.25
Electrolytic iron:
Melting stock, 99.91% Fe, irregular fragments of ⅛ in. x 1.3 in. 23.00
Annealed, 99.5% Fe. 42.50
Unannealed (99+% Fe) 36.50
Unannealed (99+% Fe) (minus 325 mesh) 53.50
Powder Flakes (minus 16, plus 100 mesh).. 31.00
Carbonyl Iron:
97.9-99.8% size 5 to 10 microns..83.00-148.00
Aluminum:
Atomized, 500 lb drums, frgt. allowed:
Carlots 31.00
Ton lots 34.00
Antimony, 500 lb lots 32.00*
Brass, ¼-ton lots .....28.75-37.50†
Bronze, ¼-ton lots .....50.00-60.00‡
Copper:
Electrolytic 13.50*
Reduced 13.50*
Lead 7.50*
Magnesium 54.00-56.00
Manganese:
Minus 35 mesh 61.00
Minus 100 mesh 67.00
Minus 200 mesh 72.00
Nickel, unannealed ... 89.50
Nickel-Silver, ¼-ton lots .....44.00-49.00§
Nickel-Silver, ¼-ton lots 46.75**
Phosphor-Bronze, ¼-ton lots 58.50
Silicon 43.50
Solder 8.50*
Stainless Steel, 302 .... 91.00
Tin 14.50*
Zinc, ¼-ton lots.15.00-28.75‡
Tungsten Dollars
Melting grade, 99% 60 to 200 mesh:
1000 lb and over... 4.95
Less than 1000 lb .. 5.10
Chromium electrolytic 99.9% Cr min. 3.50

*Plus cost of metal, †Depending on composition, ‡Depending on mesh. §70% Cu, 20% Zn, 10% Sn. **64% Cu, 18% Zn, 18% Sn.

Footnotes

(1) Chicago base.
(2) Angles, flat, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛" to 1 7/16"; 1 7/16" to 1 15/16" 4.58c; 1 15/16" to 7 5/16" 4.95c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 36" wide.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 5.40c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon and 0.35c for H.S.-L.A.
(31) Base; deld. within mill county.
(32) Buffalo base.
(33) To jobbers, deduct 20c
(34) 9.60c for cut lengths
(35) 72" and narrower.
(36) 54" and narrower
(37) 13 gage & lighter; 60" & narrower.
(38) 14 gage & lighter: 48" and narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths
(48) 6-7 gage.
(49) T-post; deduct 2 cols for U-post.

STAINLESS STEEL MILL PRICES

(Representative prices cents per pound; subject to current lists of extras)

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R. & C.F. H.R. Strip	Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	16.25	20.50	29.50	34.25	29.75	35.25	37.25	38.25	38.25
302	17.25	22.75	29.75	34.50	32.00	35.50	37.50	41.50	41.50
302B	18.50	24.50	30.50	34.50	35.00	35.50	37.50	44.75	44.75
303	18.75	24.75	32.25	37.25	36.75	38.25	39.75	48.75	45.50
304	18.25	23.75	31.00	36.00	34.25	37.25	39.75	43.75	43.75
304L	....	....	36.75	....	....	42.75	45.25	49.00	49.00
306	19.50	25.50	....	36.25	37.00	37.50	42.00	51.75	46.75
308	19.75	26.25	35.25	40.75	38.00	42.00	46.00	48.00	48.00
309	26.50	34.75	43.25	49.25	49.25	50.50	53.75	62.00	62.00
309S	28.50	37.50	47.50	54.50	54.00	55.50	59.00	68.50	68.50
310	33.00	43.25	56.75	66.25	62.75	67.50	69.00	72.25	72.25
314	....	....	....	....	....	....	69.00	74.50	....
316	28.00	36.25	46.75	54.50	53.25	55.50	59.00	62.75	62.75
316L	....	....	52.50	....	58.25	61.00	64.25	67.75	67.75
317	33.00	43.50	58.25	66.75	67.50	68.25	70.75	77.00	77.00
318	33.50	44.00	55.25	64.50	66.25	65.50	68.75	80.25	80.25
321	22.75	29.50	35.25	40.75	41.00	42.00	46.00	50.50	50.50
330	....	....	58.00	....	....	68.50	70.00	73.75	77.75
347	24.50	32.25	39.50	45.75	46.50	46.75	51.25	59.25	59.25
403	....	....	27.00	30.75	....	32.00	34.25	44.00	41.25
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	39.75	39.75
410	14.00	18.25	24.00	27.75	26.25	28.75	30.00	34.25	34.25
416	....	....	24.50	28.25	....	29.25	30.50	41.25	41.25
420	22.00	28.50	29.25	34.00	35.50	35.00	38.50	52.75	52.75
430	14.25	18.50	24.50	28.25	27.00	29.25	30.50	34.75	34.75
430F	....	18.75	25.00	28.75	....	29.75	31.00	44.00	44.00
431	14.50	28.50	25.00	28.25	27.50	29.25	30.50	35.25	35.25
440A,B,C	....	28.50	29.25	34.00	....	35.00	38.50	49.25	52.75
442	....	....	....	28.00	....	....	30.50	35.25	48.25	47.75
446	....	....	....	33.75	38.25	50.25	39.50	40.75	59.75	59.75
501	....	....	....	14.00	14.50	21.25	16.00	18.25	29.00	29.00
502	....	....	....	15.25	16.00	22.25	17.00	20.00	30.00	30.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Shenango Agaloy Tube Co.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

CLAD STEEL

Cladding Stainless	Plates: Carbon Base 10%	Plates: Carbon Base 20%	Sheets: Carbon Base 20%	Sheets: Copper Base Both Sides
302	....	31.00	31.00	77.00
304	27.60	32.50-32.70	32.50	77.00
310	36.50	41.00	.....	144.00
316	32.60	37.70-42.75	42.75	....
318	37.00	42.20	.....	....
321	29.80	34.40-37.00	37.00	111.00
347	30.40	35.50-40.50	40.50	130.00
405	23.40	30.60	.....	....
410	22.90	30.10	.....	....
430	22.90	30.10	.....	....
Inconel	41.23	54.18	.....	165.00
Nickel	37.50	50.90	.....	....
Monel	38.90	51.80	.....	....
Copper*	....	.....	46.00	....

	Strip, Carbon Base: Cold Rolled 10%	Cold Rolled Both Sides	Hot-Rolled 10%	Hot-Rolled Both Sides
Copper*	27.85	35.85	24.00	32.25

* Deoxidized. Production points: Stainless sheets, Ne Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C2 Coatesville, Pa. L7, New Castle, Ind. I-4 and Washingto Pa. J3; nickel, inconel, monel-clad plates, Coatesville L Copper-clad strip, Carnegie, Pa. S18. Production point f copper-base sheets is Carnegie, Pa. A13.

TOOL STEEL

Grade	$ per lb	Grade	$ per
Regular Carbon	0.25	5% Cr Hot Work	0.
Extra Carbon	0.30	W-Cr Hot Work	0.
Special Carbon	0.355	V-Cr Hot Work	0.42-.
Oil Hardening	0.37-.390	Hi-Carbon-Cr	0.665-.

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per
20.25	4.25	1.6	12.25	...	3.8
18.25	4.25	1	4.75	...	2.160-2.3
18	4	2	9	...	2.5
18	4	2	....	...	1.6
18	4	1	....	...	1.4
13.5	4	3	....	...	1.7
6.4	4.5	1.9	....	5	1.005-1.0
6	4	3	....	6	1.2
2	4	1.2	....	...	0.4
1.5	4	1	....	8.5	0.865-0.8

Tool Steel producers include: A4, A8, B2, B8, C4. C C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

PIG IRON

Gross Ton

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
AlabamaCity R2	52.38	52.88	....	....
Birmingham R2	52.38	52.88	....	....
Birmingham U6	....	52.88	....	....
Woodward,Ala. W15	52.38	52.88	56.50†	....
Cincinnati, del.	....	60.43	....	....
Buffalo District				
Buffalo R2, H1	56.00	56.50	57.00	....
Tonawanda,N.Y. W12	56.00	56.50	57.00	....
No.Tonawanda,N.Y. T9	....	56.50	57.00	....
Boston, del.	66.65	67.15	67.65	....
Rochester,N.Y., del.	59.02	59.52	60.02	....
Syracuse,N.Y., del.	60.12	60.62	61.12	....
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Gary,Ind. U5	56.00	....	56.50	....
IndianaHarbor,Ind. I-2	56.00	....	56.50	....
So.Chicago,Ill. W14, Y1	56.00	56.50	56.50	....
So.Chicago,Ill. U5	56.00	....	56.50	57.00
Milwaukee, del.	58.17	58.67	58.67	59.17
Muskegon,Mich., del.	....	62.80	62.80	....
Cleveland District				
Cleveland A7	56.00	56.50	56.50	57.00
Cleveland R2	56.00	56.50	56.50	....
Akron,O., del. from Cleve.	58.75	59.25	59.25	59.75
Lorain,O. N3	56.00	....	....	57.00
Mid-Atlantic District				
Bethlehem,Pa. B2	58.00	58.50	59.00	59.50
NewYork, del.	....	62.28	62.78	....
Newark, del.	61.02	61.52	62.02	62.52
Birdsboro, Pa. B10	58.00	58.50	....	....
Steelton,Pa. B2	58.00	58.50	59.00	59.50
Swedeland,Pa. A3	58.00	58.50	59.00	59.50
Philadelphia, del.	59.66	60.16	60.66	61.16
Troy,N.Y. R2	58.00	58.50	59.00	....
Pittsburgh District				
NevilleIsland,Pa. P6	56.00	56.50	56.50	57.00
Pittsburgh (N&S sides), Ambridge, Aliquippa, del.	57.37	57.87	57.87	58.37
McKeesRocks, del	57.04	57.54	57.54	58.04
Lawrenceville,Homestead, Wilmerding,Monaca, del.	57.66	58.16	58.16	58.66
Verona,Trafford, del.	58.19	58.69	58.69	59.19
Brackenridge, del.	58.45	58.95	58.95	59.45
Bessemer,Pa. U5	56.00	....	56.50	57.00
Clairton,Rankin,So.Duquesne,Pa. U5	56.00	....	....	....
McKeesport,Pa. N3	56.00	....	....	57.00
Midland,Pa. C18	56.00	....	....	....
Monessen,Pa. P7	56.00	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malleable	Bessemer
Hubbard,O. Y1	....	....	56.50	....
Sharpsville,Pa. S6	56.00	56.50	56.50	57.00
Youngstown Y1	....	....	56.50	57.00
Youngstown U5	56.00	....	....	57.00
Mansfield,O., del.	60.90	....	61.40	61.90
Duluth I-3	56.00	56.50	56.50	57.00
Erie,Pa. I-3	56.00	56.50	56.50	57.00
Everett,Mass. E1	60.75	61.25	61.75	....
Fontana,Calif. K1	62.00	62.50	....	....
Geneva,Utah C11	56.00	56.50	....	....
GraniteCity,Ill. G4	57.90	58.40	58.90	....
Ironton,Utah C11	56.00	56.50	....	....
LoneStar,Texas L6	52.00	52.50*	52.50	....
Minnequa,Colo. C10	58.00	59.00	59.00	....
Rockwood,Tenn. T3	....	....	56.50	....
Toledo,O. I-3	56.00	56.50	56.50	57.00
Cincinnati, del.	61.76	62.26	....	....

* Low phos. southern grade. † Phos., 0.30 max.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage there over base grade, 1.75-2.25%, except on low phos iron on which bas is 1.75-2.00%.
Phosphorus: Deduct 38 cents per ton for P content of 0.70% and ove
Manganese: Add 50 cents per ton for each 0.50% manganese over 1 or portion thereof.
Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton an each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.50 for each 0.5% Si; 75 cents for each 0.5% Mn over 1%)

Jackson,O. G2, J1	$67.0
Buffalo H1	68.5

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.45 f each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max

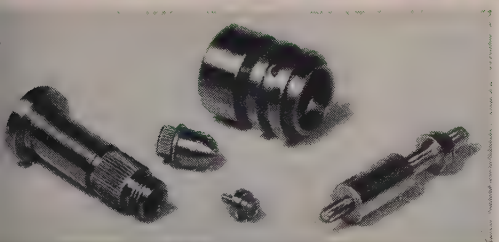
NiagaraFalls,N.Y. P15	$87.
Keokuk,Iowa, Openhearth & Fdry, freight allowed K2	92.
Keokuk, OH & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	95.
Wenatchee,Wash. OH & Fdry, freight allowed K2	92.

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate A7	$61.
Rockwood,Tenn. T3	70.
Steelton,Pa. B2	64.
Philadelphia, del.	64.
Troy,N.Y. R2	64.

For Atlantic Automatic Co., Cleveland, Ohio:

Tool Life Increased Over 200%!



PARTS FOR GEARS & CAR TRANSMISSIONS are just a few of the many delicate machine tool products Atlantic turns out. Cities Service Chillo Cutting Oil has helped Atlantic maintain their great reputation for quality products.

or the services of a Cities Service Lubri-ation Engineer... Write Cities Service)il Company, Sixty Wall Tower, lew York City 5, New York.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

"Cities Service Chillo Cutting Oil Has Proved To Be The Difference Between Ordinary And Quality Production In Our Shop!"

Here's Atlantic Automatic's story in their own words: "One of our tougher jobs recently was machining SAE 446 Stainless Steel with two forming, one threading and three drilling operations. The critical operation was drilling a .025 inch diameter hole, ⅛ inch deep. The drill would soon pack with chips and break. When a Cities Service Lubrication Engineer was called in, he recommended our using Chillo 44.

"This light-colored oil did the trick. DOWN TIME WAS CUT IN HALF AND DRILL LIFE INCREASED OVER 200%!

"We use Cities Service Chillo 44 to machine all types of metals covering a range of machinability from brass to stainless on our Brown and Sharpe 00G, 0G and 2G Automatics. It has proved to be the difference between ordinary and quality production in our shop!"

WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except: New York, 3[illegible] cents; Philadelphia, 25 cents; Birmingham, Erie, St. Paul, 15 cents; Seattle and Spokane, Wash., no charge.)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‡	H.R. Alloy 4140††§		Carbon	Floor
Baltimore	6.20	7.12	7.78	7.00	...	6.86	8.17[6]	12.04	6.98	6.85	7.98
Birmingham	6.10	7.00	8.00[2]	6.30	...	6.15	8.90	....	6.35	6.35	8.25
Boston	6.89	7.83	9.18	7.13	...	6.87	8.35	12.13	7.06	7.13	8.26
Buffalo	6.18	7.15	8.70	6.79	...	6.35	7.70	12.02	6.59	6.68	7.88
Charlotte, N. C.	6.95	7.80	8.69	6.90	...	7.10	8.37	....	7.10	7.10	8.37
Chicago	6.18	7.12	7.95	6.42	...	6.28	7.30	11.60	6.46	6.33	7.46
Cincinnati	6.30	7.11	8.20	6.66	...	6.52	7.60	11.85	6.64	6.62	7.71
Cleveland	6.18	7.12	8.25	6.58	...	6.34	7.40	11.74	6.79	6.50	7.63
Detroit	6.38	7.29	8.22	6.69	7.36	6.56	7.60	11.97	6.91	6.80	7.80
Erie, Pa.	6.15	...	8.15	6.45	...	6.23	7.50[6]	....	6.46	6.33	7.46
Houston	7.15	7.60	9.23	7.45	9.30	7.45	9.30	....	7.35	7.20	8.55
Los Angeles	7.25	8.60	8.85	7.55	11.20	7.15	9.10	13.05	7.35	7.20	9.25
Milwaukee	6.35	7.29	8.12	6.59	...	6.45	7.57	11.77	6.63	6.50	7.63
Moline, Ill.	6.53	7.47	8.30	6.77	...	6.63	7.65	....	6.81	6.68	...
New York	6.78	7.52	8.37	7.16	...	7.06	8.43[6]	11.99	6.90	6.99	8.30
Norfolk, Va.	6.90	...	...	7.00	...	7.00	8.50	....	7.00	7.00	7.65
Philadelphia	6.35	7.13	7.87	7.02	8.80	6.87	8.19[6]	11.74	6.67	6.63	7.66**
Pittsburgh	6.18	7.12	8.00	6.55	...	6.28	7.65	11.60	6.46	6.33	7.46
Portland, Oreg.	7.60	8.45	9.05	7.65	...	7.35	10.65	....	7.25	7.30	9.15
Richmond, Va.	6.50	...	8.67	7.10	..	7.05	8.20	....	7.10	6.85	8.20
St. Louis	6.48	7.42	8.25	6.72	...	6.58	7.70	11.90	6.86	6.73	7.86
St. Paul	6.84	7.78	8.61	7.08	...	6.94	8.06	....	7.12	6.99	8.12
San Francisco	7.35	8.70	8.95	7.60	...	7.15	9.75	12.90	7.25	7.20	9.25
Seattle	8.15	9.50	9.80	8.00	...	7.60	10.65	13.50	7.50	7.60	9.40
Spokane	8.15	9.40[7]	9.80	7.60	...	7.60	10.55[8]	14.10	7.25	7.35	9.40
Washington	6.71	7.65	8.35	7.51	...	7.37	8.43	....	7.49	7.36	8.49

*Prices do not include gage extras; †prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extras excluded); ‡includes 35-cent special bar quality extra; §as rolled; **⅛-in. and heavier, add 0.34c for 12 gage and lighter. ††as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip and cold-finished bars, 2000 lb and over, except in Seattle where base is 2000 to 9999 lb; [2]—500 to 9999 lb; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—1500 lb to 3999; [8]—under ½ in.

May Warehouse Orders Rise Slightly

Upturn in volume experienced so far this month is seen indicating the turning point in demand has been reached. Distributors are in best inventory position in years

New York—Reduction in warehouse inventories is depressingly slow at current rate of sales which for May will approximate April in standard carbon products. Some specialties will be slightly higher. Numerous small orders operate toward higher distribution costs with most warehouses as hand-to-mouth buying continues. Where suppliers have followed adjustments in flat-rolled stainless, distributors are following. Sharpest reduction is in 430 cold drawn flat sheets, $3.75 per 100 pounds, with demand for this grade slow.

Boston—Volume with warehouses this month will be 5 to 10 per cent better than in April. Orders are more numerous, but continue small. Cold-rolled screw stock is slow, but in most carbon products sales are slightly heavier. Although still saddled with off-size and slow-moving grades, taken in late last year, inventories of more standard products are sliding to the point where more replacement orders are in sight. Warehouses are going slow on stainless and as long as steel is available for prompt shipment they will write up orders on a monthly basis.

Chicago — May steel warehouse sales are showing a slight increase over April but the margin is small. Inquiries are somewhat better too. However, neither sales nor inquiries show spurts in specific consuming industries.

Cleveland — Seasonal buying of building steel items is putting some spirit into an otherwise dull warehouse market here. Generally, demand remains slow in most products and with warehouse stocks in the best position in years competition for orders is extremely keen.

Philadelphia—Leading distributors report May business as being up fractionally over that for the corresponding period of April. But there is not enough improvement to indicate a definite trend. Competition continues keen, and while not af-

STEEL IMPORT PRICES

(Base, per 100 lb, landed, duty paid)

	North Atlantic	South Atlantic	Gulf Coast	West Coast*
Deformed Bars, Intermediate, ASTM-A-305	$4.55	$4.55	$4.50	$4.83
Bar Size Angles	4.40	4.40	4.35	4.68
Structural Angles	4.40	4.40	4.35	4.68
I-Beams	4.40	4.40	4.35	4.68
Wide Flange Beams	4.80	4.80	4.80	5.08
Sheet and Plate, 10 gage, 11 gage, 5' x 10'	5.50	5.50	5.45	5.78
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.50	25.70	25.50	26.34
Barbed Wire	6.60	6.60	6.60	6.68
Merchant Bars	4.55	4.55	4.50	4.83
Hot-Rolled Bands	4.70	4.70	4.65	4.98
Wire Rods, Thomas Commercial No. 5	4.77	4.84	4.82	5.09
Wire Rods, O-H, Cold Heading Quality No. 5	5.23	5.30	5.28	5.55
Bright Common Wire Nails, 8d	6.55	6.65	6.60	6.85

*Not including $2.20 per net ton customarily charged in most West Coast ports for wharfage and handling.

Size O.D.	Wgt/Foot/Lb	Gulf Port	West Coast	Vancouver
Seamless A.P.I. Casing, Grade J-55:				
5½ in.	15.5	$1.47/ft	$1.51/ft	$1.32/ft
7 in.	23	2.10/ft	2.17/ft	1.90/ft
Seamless N-80 Casing:				
5½ in.	17	1.94/ft	2.00/ft	1.75/ft
7 in.	23	2.50/ft	2.70/ft	2.36/ft
Seamless J-55 Tubing:				
2⅜ in.	4.7	0.60/ft	0.63/ft	0.55/ft
2⅞ in.	6.5	0.80/ft	0.83/ft	0.73/ft

Sources of shipment: Western continental European (Schuman Plan) countries.

cting base prices it does show up the cutting of extras, in particular. ower rail freight rates which went to effect in late March have not ad much bearing on warehouse rices to date. There is a disposition wait and see what adjustments ay be made in trucking rates.

Pittsburgh—Distributors generally elieve a turning point has been eached in steel ordering. Although ales are holding even, fabricators ave generally worked inventories own to satisfactory level. As evience that inventories require no mmediate bolstering, warehouses reort no stocking to hedge against a ossible strike.

Both hot and cold-rolled sheet ales remain dull, but gains are reorted in shipments of galvanized. emand for structural shapes is rong, but sales of such other prodcts as steel bars are spotty.

Los Angeles—With inquiries increasing slowly, distributors anticiate an improved second quarter. Warehousemen say 1 out of 3 inquirs results in sales. Activity is steady t the April level.

Seattle—Warehouse volume is not ncreasing as much as expected and or May will probably be the same s April. Out of stock items are oving fairly actively but alloys are low. Some firms report wide flange ections in good supply, others have ifficulty in obtaining this material.

Structural Shapes . . .

Structural Shape Prices, Page 146

Boston — Bridge superstructure, akonnet river, Tiverton, R. I., 7500 ons, is out for estimates, closing une 16. Second half structural volme for bridges will be heavier, inluding part of nearly 175 spans reuired for the Massachusetts turnike. Many will be small with five ajor tonnage projects.

New York—Although bridge work onstitutes the principal tonnage, here nevertheless is a fairly good iversification of construction in othr lines, including hospital, industrial nd commercial building.

Philadelphia—Structural demand is eatured by the erection of a 2600on armor plate unit at the plant of he Lukens Steel Co., Coatesville, Pa., nd an inquiry for approximately 500 tons for hangars at the Army ir Force base, Dover, Del. Busiess otherwise is fairly sustained, with ompetition among the fabricators till highly active.

Seattle—Sizable projects involving hapes are developing in this area nd indicate continued active operaions for fabricating shops.

Sheet Shipments Reported Gaining

Virtually all grades appear in stronger demand but galvanized is making the best showing. Pickup in buying seen reflecting gradual liquidation of inventories

Sheet and Strip Prices, Page 146 & 147

Philadelphia—Virtually all grades of sheets are moving a bit more actively. This is especially noticeable in galvanized and certain of the specialties including enameling stock, low silicon electrical sheets and stainless sheets, and reflects a betterment in light consumer durable goods, as applied particularly in this district. There is a disposition too, to buy a little further ahead than heretofore.

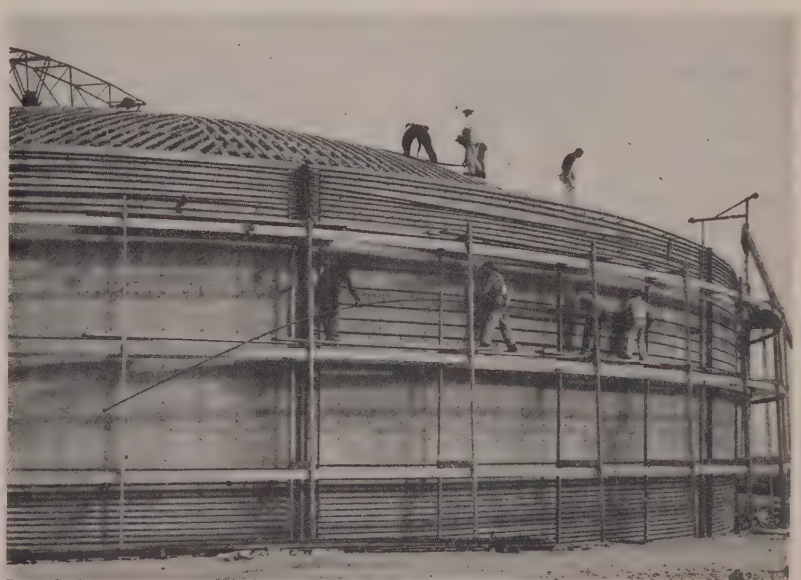
Cleveland — Some slight improvement in demand for the light, flat-rolled products is noted by sellers in this district, but consumers continue to order sparingly, largely against needs. Pickup in orders of a fill-in nature indicate inventory liquidation is pretty well advanced. Generally, it is not expected much in the way of replacement buying will develop so long as tonnage is available for prompt mill shipment. Relatively little in the way of protective ordering against a possible steel strike this summer is yet noted.

Effective with shipments as of May 13, Republic Steel Corp. revised its schedule of base prices and extras on stainless products. The changes include the consolidating of cold-rolled sheets and strip into one classification carrying the same base price.

Pittsburgh—Cold-finished sheet order books show gradual increases in orders from major automakers, but this is partially nullified by slow sales to independents. Most encouraging aspect of sales is increased ordering from appliance manufacturers.

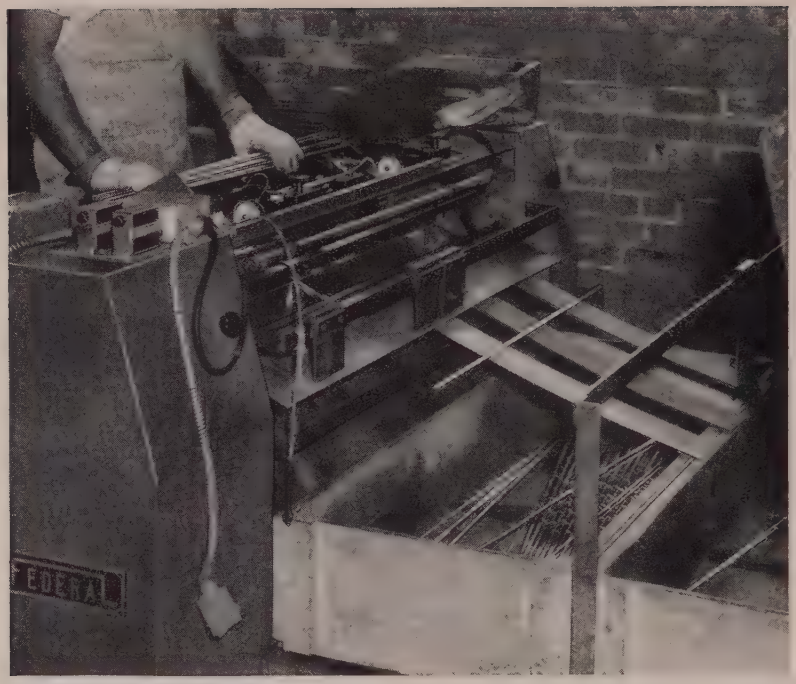
Galvanized sheet distributors report growing sales to air conditioning manufacturers and predict that a good residential construction year will boost use of their product in heating systems.

Boston—Sold through July, galvanized sheets are the most extended in delivery of the light flat-rolled products. Capacity on continuous mills producing new process galvanized specialties is taken up through October. One mill is holding up bookings beyond. Part of this buying of galvanized is seasonal. There is marked improvement in galvanized sheet quality since buyers took market control. They had to put up with some poor coatings before. Carbon



Buttoning Up Huge Water Tank

Workmen for McGrath Steel Co., Emeryville, Calif., put 470 steel rods around this 3 million gallon water storage tank. The rods, 43 ft long and ⅞-in. square were rolled at Bethlehem Pacific Coast Steel Corp.'s South San Francisco plant; were upset and threaded at each end in the nut and bolt specialty department



Golfers and Golf Club Makers Win because this Federal Eccentricator Gage detects built-in hooks and slices in golf club shafts. Its 3 electrical Eccentricators inspect for straightness and automatically sort into good and bad. Gage is adjustable for lengths. Also measures and sorts tubular auto antennae and parallel tubes.

Precision Makes Winners

Even where you might not expect it Precision is winning the battle against the high cost of controlling quality.

Until recently many manufacturers of products such as the one above thought that only machine parts producers could afford high-speed measuring, inspecting, sorting and size-control gages. But they discovered that costly engineering was not always required to apply gages for special purposes. So they replaced their outmoded methods with modern methods. Now they're winners, too.

"Special" gages are now standard in the *complete* line of *modern* Federal gages. That's because Federal has engineered more than 30,000 dial indicating, air, electric and electronic gages . . . each for a specific reason.

That tremendous backlog of gaging experience is important to you. Chances are that Federal already has the *one* gage that will cut costs on one of your measuring, inspecting, sorting or size-control operations. Or, maybe a slight adaptation will do the job. In either case, you'll save time and money.

It costs nothing to find out whether Federal can furnish a gage that will boost your quality while cutting your costs. So, why not write for a Federal Sales Engineer to talk over your dimensional maintenance problems. Federal Products Corporation, 4215 Eddy St., Providence 1, R. I.

Ask **FEDERAL**

FOR ANYTHING IN MODERN GAGES...

Dial Indicating, Air, Electric, or Electronic — for Inspecting, Measuring, Sorting, or Machine Size Control.

sheets and strip are not keeping pace with the pickup in galvanized.

New York—Demand for practically all lines of sheets is showing a little improvement. This is particularly true of galvanized and some specialties. Enameling stock used extensively in stoves, sanitary ware, refrigerators and washing machines, is not only moving better, but is being placed for delivery further ahead than in some time.

Low silicon electrical sheets, used extensively in fractional horsepower motors, show a further uptrend, indicating at least in part a little livelier activity in the manufacture of light durable goods. High silicon electrical sheets, required in the manufacture of heavy electrical equipment, continues in good demand.

St. Louis—Sheet demand continues to inch upward. Volume is fair and so far on a par with last month.

Steel Bars . . .

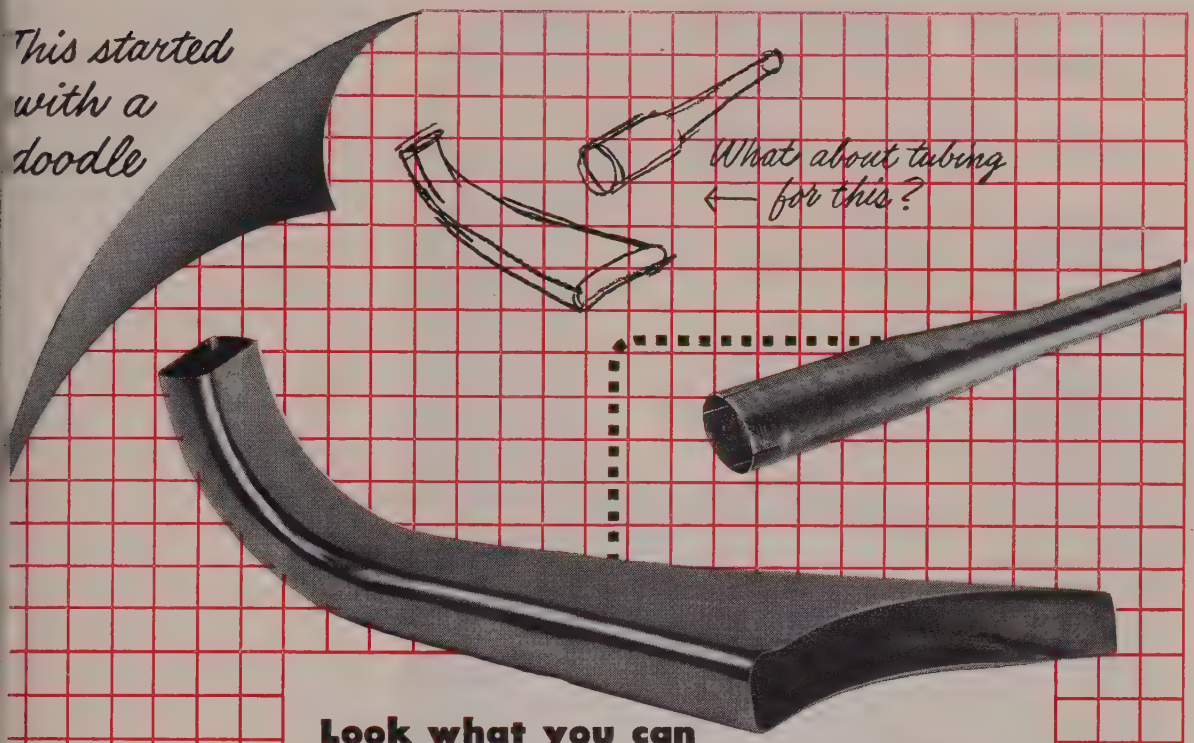
Bar Prices, Page 146

Cleveland—Merchant bars are moving a little better in some areas of consumption but, in general, market activity is little changed from that of recent past weeks. Consumers still appear to be working off inventories, though the appearance of some spot shipment orders indicates that in some instances these have been pretty well worked down, or at least are at a point where fill-in tonnage is required.

Boston—Beginning with shipments May 24, Republic Steel Corp. will price cold-finished carbon bars on a delivered county basis. For several months this policy has been applicable to hot-rolled bars with the Buffalo base governing for the bulk of tonnage moving to New England. In the case of cold-finished, Hartford, Conn., is base, the bulk of sizes and shapes used in this area being produced there.

Philadelphia—Business in hot-rolled carbon commercial bars still lags, although not quite as badly as heretofore. June is regarded by many producers of bars, and, in fact, of steel products generally, as being a critical month. That month should clear up all question as to the possibility of a steel strike.

Pittsburgh—Slight gains in reinforcing bar shipments is the only change this month in bar activity. Purchasing of cold-finished bars shows the same hand-to-mouth pattern as last month. Two major consumers last year—defense industries and warehouses—have not reported any change in requirements.



Look what you can do with Stainless Steel Tubing

Ever try to make a tapered, rectangular tube with a bend in it? That was the problem which faced Configured Tube Products Company of Chicago when an order was received for a stainless steel spout for a cream separator.

Of course, you can cut out a blank, form it, bend it and weld it. That's the hard way. Too many expensive operations.

Configured Tube Products did it by starting with a length of Republic ELECTRUNITE Stainless Steel Tubing. Using an exclusive Republic process, the round tube was configured to the tapered shape shown above. This process controls the wall thickness, keeping it uniform, and makes possible a smooth, wrinkle-free bend.

The tube is shaped on special equipment, cut and polished. The result: a cream separator spout with a smooth surface free from contaminating imperfections . . . and at a reasonable production cost.

Does this give you an idea? Perhaps your product would be cheaper to produce. Or give better service. Or open up new markets if it were made from stainless steel tubing or pipe. Republic engineers will be glad to help you design with ELECTRUNITE Stainless Steel Tubing. Ask your Republic Salesman to make the arrangements.

Write for your copy of this informative booklet. It contains extensive data on how to design with ELECTRUNITE Stainless Steel Pipe and Tubing.

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Steel and Tubes Division
253 East 131st Street, Cleveland 8, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, New York

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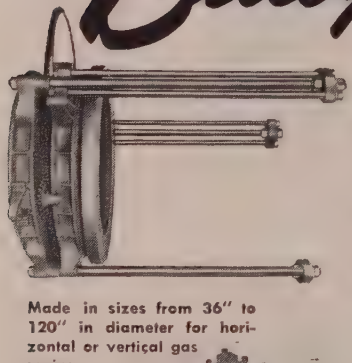
are Safest with...

Bailey thermal expansion
GOGGLE VALVES



One of nature's most dependable forces—the linear expansion and contraction of steel—frees and clamps the goggle plate of these valves. Steam applied to three sets of tubes causes expansion which frees the goggle plate for swinging to either open or closed position. When steam is removed, contraction of the tubes forms a tight, safe, leakproof seal. Can be operated by hand in case of steam failure.

Made in sizes from 36" to 120" in diameter for horizontal or vertical gas mains.

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ENGINEERS
LEADERSHIP THROUGH QUALITY
1221 BANKSVILLE ROAD PITTSBURGH 16, PA

Tin Plate . . .

Tin Plate Prices, Page 148

Pittsburgh—Producers continue to operate close to capacity to meet an improving flow of orders. Stocks at tin mills are gradually being depleted, while can companies build their inventories.

Wire . . .

Wire Prices, Page 148

New York—Wire consumers are buying little beyond immediate requirements. Orders are usually small and for prompt delivery. Both high carbon specialties and low carbon grades are included in this trend and May bookings will be only slightly if any, heavier than in April.

Boston—In few cases, wire consumers are anticipating needs, but orders are mostly for prompt shipment. Where inventory control has been too drastically applied, orders are appearing for additional volume.

San Francisco — Foreign wire is appearing in increasing volume in this area.

Plates . . .

Plate Prices, Page 146

Pittsburgh—Residential and highway construction continues to account for large quantities of plate but demand from other quarters is lessening. Industrial and commercial construction is slow compared with last year, and heavy competition rules this market.

Boston—Plate bookings for June indicate no substantial improvement in second quarter lag with orders confined mostly to specific requirements. There is practically no buying for inventory, but this might change should suspension in production over labor contracts become more serious.

New York—Light tank and boiler work appears to be the only line to reflect any improvement in plate demand in this district. Oil and chemical requirements are fairly active although not showing any particular improvement.

Philadelphia—Plate demand shows no appreciable change one way or the other. District mills still have considerable free capacity.

Chicago—Plate deliveries are becoming more current. One mill is offering 3 to 4 weeks delivery on sheared and 2 to 3 weeks on universal mill plates.

Seattle—No large plate projects are up for immediate action, inquiry being largely for small storage tanks

etallurgical Coke . . .

Metallurgical Coke Prices, Page 161

Chicago—Foundries are carrying ht inventories of coke, thus their rchases pretty well parallel melt- g operations.

TRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

00 tons, Navy armor plate plant, Lukens Steel Co., Coatesville, Pa., through Brotherton Construction Co., Harrisburg, Pa., general contractor to Belmont Iron Works, Eddystone, Pa.

00 tons, sanitarium and hospital addition, Medical College of Virginia, Richmond, Va., to Richmond Steel Co.; Doyle & Russell, Richmond, general contractors.

30 tons, A & P store, Yeadon, Pa., a suburb of Philadelphia, through John A. Robbins, general contractor, to Belmont Iron Works, Eddystone, Pa.

00 tons, plant addition, Morgan Construction Co., Worcester, Mass., to Bethlehem Steel Co., Bethlehem, Pa., through E. J. Cross Co., Worcester, general contractor.

00 tons, estimated, suspension bridge to carry pipe lines over Missouri river, Plattsmouth, Nebr., to Pittsburgh Des Moines Steel Co., Des Moines, Ia.

3 tons, state bridge work, Queen Anne's county, Maryland, comprising two projects involving 128 tons and 35 tons, respectively, placed with Belmont Iron Works, Eddystone, Pa., through George & Lynch, general contractors; another project involving 90 tons awarded by James Julian, general contractor, to the Phoenix Bridge Co., Phoenixville, Pa.

0 tons, state highway bridge, Otsego county, New York, to Phoenix Bridge Co., Phoenixville, Pa.; Lane Construction Co., Meriden, Conn., general contractor.

5 tons, community center, Y.M.C.A., Quincy, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; Clark & Smith, Inc., Quincy, general contractor.

5 tons, three school buildings, Milford, Conn., 140 tons, long spans and standard joists to Bethlehem Steel Co., Bethlehem, Pa.; balance to Port Chester Iron Works; E. & F. Construction Co., Bridgeport, Conn., general contractor.

0 tons, office and plant building, Thomaston, Conn., to New England Iron Works, Inc., New Haven, Conn.; Hackert Construction Co., general contractor.

STRUCTURAL STEEL PENDING

00 tons, bridge superstructure, Sakonnet river, Tiverton, R. I.; bids June 16, Providence.

00 tons, approximately, five hangars for an air base, Dover, Del., bids to be closed June 10 by the Corps of Engineers, Philadelphia.

77 tons, state thruway bridge work, Rockland county, New York, through A. E. Ottaviano Inc., to American Bridge Division, U. S. Steel Corp., Pittsburgh.

00 tons, state office building, Augusta, Me.; alternate bids on reinforced concrete construction.

90 tons, state highway bridge, Lorain county, Ohio, contract C-23A; bids May 26, Ohio Turnpike Commission, Columbus, O.

00 tons, service building, Hecht Co., Baltimore, pending; Abbott Arkt & Co., New York, engineers in charge.

0 tons, bridge work, New York State Transit Authority, Liberty Ave., Queens, Long Island, N. Y., through Horn Construction Co., to Lehigh Structural Steel Co., Allentown.

0 tons, transit shed and warehouse, naval supply depot, Newport, R. I.; bids June 8, First Naval District, Boston.

0 tons, also 240-ft and smaller spans, extension Gorge high dam; preliminary plans prepared; Seattle will call bids shortly.

tons, addition, St. Vincent's Hospital, Seventh Ave. and Twelfth St., New York, to Grand Iron Works, Bronx, that city.

5 tons, hangar No. 11, International Airport, Queens, New York, through Ranes Construction Co., to Grand Iron Works, New York.

(*Please turn to page* 161)

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Cross-sectional areas up to .250″ square; widths up to ⅜″; width-to-thickness ratio not to exceed 6 to 1.

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CURRENT FERROALLOY QUOTATIONS

Prices as reported to STEEL

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton $86, Palmerton, Pa.; $87 Clairton and Duquesne, Pa.
(16 to 19% Mn) $84 per ton, Palmerton, Pa.; $85 per ton, Clairton and Duquesne, Pa.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $200, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; and Portland, Oreg.; add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%) Lump $208 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 27.95c per lb of contained Mn, carload packed 28.7c, ton lots 29.8c, less ton 31.0c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max, 0.30% C, 1.5c for max 0.50% C, and 4.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85% C 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese metal, 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 36.2c per lb of metal; packed, 36.95c; ton lot 38.45c; less ton lots 40.45c. Delivered. Spot, add 2c.

Electromanganese: Min. carloads, 30c; 2000 lb to min. carloads, 32c; 250 lb to 1999 lb, 34c; less than 250 lb, 37c. Premium for hydrogen-removed metal, 1.5c per lb, f.o.b. cars, Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-85%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 11.00c per lb of alloy, carload packed, 11.75c, ton lots 12.65c, less ton 13.65c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, C.l., lump, bulk 24.75c per lb of contained Cr; c.l. packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.025% C (Simplex) 34.50c per lb contained Cr, 0.03% C 36.50c. 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c 2% C 32.75c. Carload packed add 1.1c, ton lot 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%). Contract, c.l. 8 M x D, bulk, 26.25c per lb contained Cr. Packed, c.l. 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8 M x D, 18.35c per lb of alloy; ton lot 19.2c; less ton lot, 20.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 24.75c per lb of contained chromium plus 10.8c per pound of contained silicon; 1" x down, bulk 25.25c per pound of contained chromium plus 11c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min 97% Cr and 1% Fe) contract, 1" x D; packed, max 0.50%, carload $1.12, ton lots $1.14; less ton $1.16. Delivered. Spot, add 5c. Prices on 0.10 per cent carbon grade, add 4c to above prices.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.00 per lb of contained V. Delivered. Spot, add 10c **Crucible-Special Grades** (V 35-55%, Si 2-3.5% max, C 0.5-1% max). $3.10. **Primos and High Speed Grades** (V 35-55%, Si 1.50% max, C 0.20% max) $3.20.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vandium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 10.80c per lb of contained Si, carload packed 12.40c, ton lot 13.85c, less ton 15.5c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.7c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 12.2c per pound contained silicon; carload packed 13.55c; ton lots, 14.75c; less ton, 16.1c, delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.8c per lb of contained Si, carload packed 15.1c, ton lot 16.25c, less ton 17.5c. Delivered. Spot, add 0.8c.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.0c per lb of contained Si, carload packed 18.2c, ton lot 19.15c, less ton 20.2c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 97% Si and 1% max Fe) C.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max, 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.25c per lb of alloy, ton lots packed 10.15c, 200 to 1999 lb 10.50c, smaller lots 11c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max). Contract, c.l. lump, bulk 8.0c per lb of alloy, c.l. packed 8.75c, ton lot 9.5c, less ton 10.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.
Carbortam: (B 1 to 2%) Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.25c per lb of briquet, carload packed 16 95c, ton 17.75c, less ton 18.65c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.45c per lb of briquet, c.l. packaged 13.25c, ton lot 14.05, less ton 14.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.65c, per lb of briquet, c.l. packaged 13.45c, ton lot 14.25c, less ton 15.15c Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.3c per lb of briquet. Packed c.l. 7.10c, ton lot 7.9c, less ton 8.8c. Delivered. Spot, add 0.25c.

(Small size—Weighing aprox. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.45c. Packed c.l. 7.25c, ton lot 8.05c, less ton 8.95c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.80 per lb of contained W; 2000 lb W to 5000 lb W, $3.90; less than 2000 lb W, $4.02, f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $9.50 per lb of contained Cb, less ton $9.55. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min, C 0.30% max) ton lots, 2" x D, $4.75 per lb of contained Cb plus Ta, deld.; less ton lots $4.80.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ¼" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.50c per lb of alloy; ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l packed 16.6c per lb of alloy; ton lots 18.10c; less ton lots 19.35c, f.o.b. Niagara Falls; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 14.50c. Packed c.l. 15.50c, ton lots, 15.75c, less ton lots,16.25c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carloads, f.o.b sellers' works, Mt. Pleasant, Siglo, Tenn. $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, f.o.b. Langeloth, $1.32 in all sizes except powdered which is $1.41; Washington Pa., furnace, any quantity $1.32.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa., $1.14 in cans; in bags, $1.13, f.o.b. Langeloth, Pa.; Washington, Pa., $1.13.

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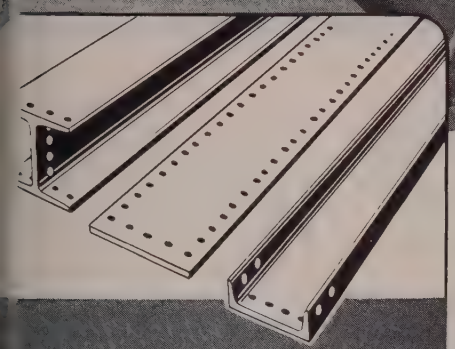

This new Spacing Table-Beam Punch Combination handles beams, channels, angles and cover plates with a minimum of tool changing and maximum economy.

Built in various tonnages and lengths to meet your needs

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designed for the smaller fabricating shop

THOMAS . . for years the leader in the development of spacing machines . . now offers a fitting companion to the famous Thomas Automatic, used in practically all major high-production shops. It's the Thomas Motorized Indicator Spacing Machine, specially designed with traditional Thomas quality features, to meet the needs of the smaller fabricating shop.

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MACHINE MANUFACTURING CO.
PITTSBURGH 23, PA.

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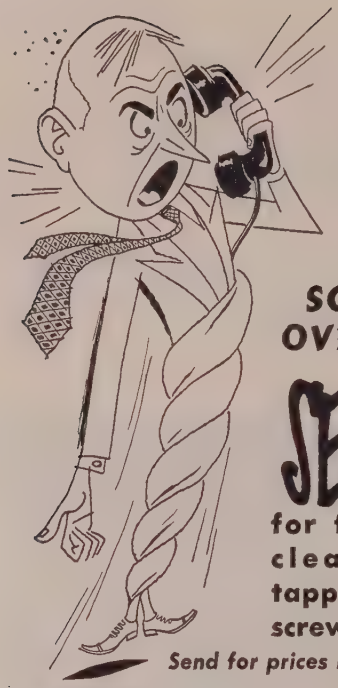

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see

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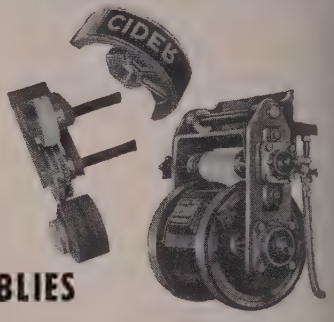

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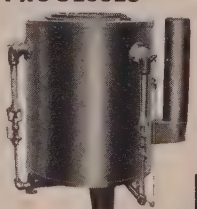
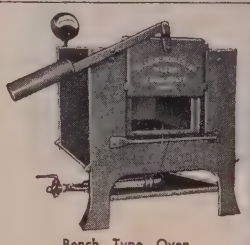
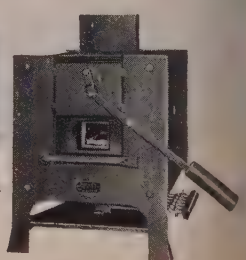


Atmospheric Pot Furnace 1650° F



Bench Type Oven Furnace 2000° F



High Speed Full Muffle Furnace 2400° F

WRITE TODAY FOR COMPLETE "BUZZER" CATALOG

CHARLES A. HONES, INC.

125 South Grand Avenue, Baldwin, L. I., N. Y.

(*Continued from page* 157)

ons, approximately, fixed base operations
gar, City of Philadelphia, bids June 10.
ns, Army Alaskan warehouses; bids soon
J. S. Engineer, Seattle.
ons, warehouse, terminal facilities, Whit-
Alaska; rebid date advanced to May
to U. S. Engineer, Seattle.
tons, state highway bridge, Dedham-
twood, Mass.; S. & M. Construction Co.,
vidence, R. I., low, general contract.
ons, pipe supports, Corps of Engineers,
waukee, Calumet Structural Steel Fab-
ttors, Detroit, low.
ons, distribution building, Western Electric
, Nashville, Tenn., to Fischer Steel Co.,
mphis, Tenn.
ons, grade separation work, Queens Mid-
n expressway, New York, through Horn
struction Co., to American Bridge Divi-
, U. S. Steel Corp., Pittsburgh.
ons, addition, South Side Hospital, Bay
re, Long Island, N. Y., through E. W.
well Co., to Pecker Iron Works, Brook-
N. Y.
ons, state bridge work, Otsego county,
w York, through Wayne Construction Co.,
Phoenix Bridge Co., Phoenixville, Pa.
tons, beams, wide flange, high tensile,
vy; bids June 2, delivery Portsmouth,
H., Philadelphia and Mare Island.
ons, construction work, Carbide & Carbon
mical Co., Torrance, Calif., to Bethlehem
el Co., Bethlehem, Pa.
ons, high line trackway assembly, Wee-
wken, N. J., through Mason, Johnson &
cLean, to the Turl Engineering Co., New
k.
ons, four bridges, Alaska highways; bids
ly June to Alaska Road Commission,
eau.
ons, freight station, Lehigh Valley, New-
, N. J., bids June 24.
tons, two school buildings, East Haven,
nn., to New England Iron Works Inc.,
w Haven, general contractor; reinforcing
s to Bethlehem Steel Co., Bethlehem, Pa.
ons, turbo pedestal, Schenectady, N. Y.,
ough Ebasco Services Inc., to Pittsburgh
dge & Iron Works, Pittsburgh.
ons, $5 million high school, South Phila-
phia, Pa., bids June 4; steel requirements
stly reinforcing steel.

NFORCING BARS . . .

REINFORCING BARS PLACED

tons, sanitarium and hospital addition,
dical College of Virginia, Richmond, Va.,
Virginia Steel Co., Richmond, Doyle &
ssell, Richmond, general contractors.
tons, men's dormitory and cafeteria, Uni-
rsity of Texas, Austin, Tex., to Truscon
el Division, Republic Steel Corp., Hous-
: R. P. Farnsworth Co., Inc., New
leans, general contractor.
tons, additional placement for Scott Paper
.'s plant addition, Everett, Wash., to
thlehem Pacific Coast Steel Corp., Seattle.
tons, community center, Y.M.C.A., Quincy,
ass., to Bethlehem Steel Co., Bethlehem,
., Clark & Smith, Inc., Quincy, Mass.,
neral contractor.

REINFORCING BARS PENDING

tons, 14-story family and bachelors' quar-
rs, Whittier, Alaska; general contract to
Patti Co. and MacDonald Construction
., Kansas City, Mo., joint low, $3,987,052
U. S. Engineer.
tons, probably less under redesign, Whit-
r, Alaska, deep sea terminal; rebids to
S. Engineer, Seattle, advanced to May 25.
tons, foundations for 13 bridges, Maine
rnpike, Portland-Augusta extension; also
ection of 2180 tons, fabricated structural
el, bids May 28, Augusta, Me.
tons, state highway bridges and drainage
ructures, Lorain county, Ohio; bids May
, Ohio Turnpike Commission, Columbus,
, contract C-23A.
tons, two underpasses, Soldiers Field road,
harles River Reservation, Brighton dis-
ict, Boston; bids in to Metropolitan District
ommission, Boston.
tons, Wanship dam, near Wanship, Utah;
ds June 10, Bureau of Reclamation, Ogden,
tah; also 220 tons, outlet pipe, gates and
her metal work.

(*Please turn to page* 163)

ORES—COKE—REFRACTORIES

Prices as reported to STEEL; changes shown in italics.

ORES

Lake Superior Iron Ore

(Prices effective July 1, 1953, and thereafter; gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$10.30
Old range nonbessemer	10.15
Mesabi bessemer	10.05
Mesabi nonbessemer	9.90
Open-hearth lump	11.15
High phosphorus	9.90

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon which were in effect on June 24, 1953, and increases or decreases after such date are for buyer's account.

Eastern Local Iron Ore

Cents per unit deld. E. Pa.

Foundry and basic 56-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%	20.00
North African hematite (spot)	20.00-22.00
Brazilian iron ore, 68-69% (spot)	25.00

Tungsten Ore

Net ton unit, before duty

Foreign Wolframite, good commercial quality	$28.00
Domestic scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, $1.02-$1.05 per long ton unit c.i.f. U. S. ports, duty for buyer's account; 46-47%, $0.95-$0.97.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African	
48% 2.8:1	$40.00-$42.00
48% 3:1	44.00-46.00
48% no ratio	32.00-34.00
South African Transvaal	
44% no ratio	$24.00-$26.00
48% no ratio	34.00
Domestic (Rail nearest seller)	
48% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb, Mo content mines, unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

50-60%	$2.40-$2.80
65% min.	$3.40-$3.50

Vanadium Ore

Cents per lb. V_2O_5 content, deld. mills

Domestic	31.00

REFRACTORIES

Fire Clay Brick

High-Heat Duty: Pueblo, Colo., $89; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., Woodbridge, N. J., $109; Salina, Pa., $114; Niles, O., $120; Los Angeles, Pittsburg, Calif., $132.30.

Silica Brick

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $115; Warren, O., Hays, Pa., $120; Niles, O., $120; E. Chicago, Ind., Joliet, Rockdale, Ill., $125; Cutler, Utah, $116.55; Los Angeles, $122.85.

Insulating Fire Brick

2300° *F:* Massillon, O., $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Wellsville, O. $77.50; Mexico, Mo., $73.50; Clearfield, Pa., Portsmouth, O., $83; Perla, Ark., $109; Los Angeles, $110.25; Pittsburg, Calif., $111.30.

Sleeves

Reesdale, Pa., $139.70; Johnstown, Pa., $140; Clearfield, Pa., $148.50; St. Louis, $151.80; Athens, Tex., $155.

Nozzles

Reesdale, Pa., $223.50; Johnstown, Pa., $229.20; Clearfield, Pa., $241.40; St. Louis, $247.10; Athens, Tex., $247.70.

Runners

Reesdale, Pa., $174; Johnstown, Pa., $177.80; Clearfield, Pa., $185.50; St. Louis, $187.30; Athens, Tex., $191.80.

High-Alumina Brick

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $179; Danville, Ill., $169.30.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $223.00; Danville, Ill., $213.20.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $225; Danville, Ill., $258; Clearfield, Pa., $252.

Dolomite

Domestic, dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Narlo, Gibsonburg, Woodville, O., $14.50; Thornton, McCook, Ill., $14.60; Dolly Siding, Bonne Terre, Mo., $13.65.

Magnesite

Domestic, deadburned bulk; Luning, Nev., $38.

METALLURGICAL COKE

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.50-$15.00
Connellsville, foundry	16.50-17.00

Oven Foundry Coke

Kearney, N. J., ovens	$24.00
Everett, Mass., ovens	
New England, deld.	*26.05
Chicago, ovens	24.50
Chicago, deld.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Chicago, deld.	28.12
Cincinnati, deld.	25.85
Painesville, O., ovens	25.50
Cleveland, deld.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Buffalo, ovens	*25.00*
Buffalo, deld.	*26.25*
Lone Star Tex., ovens	18.50
Philadelphia, ovens	23.00
Swedeland, Pa., ovens	23.00
St. Louis, ovens	
St. Louis deld.	26.00
St. Paul, ovens	23.75
Portsmouth, O. ovens	24.00
Cincinnati, deld.	26.62
Detroit, ovens	25.50
Detroit, deld.	26.50
Pontiac, deld.	27.06
Saginaw, deld.	28.58

*Or within $4.55 freight zone from works.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol	40.00
Toluol, one deg	32.00-35.00
Industrial xylol	32.00-35.00

Per ton, bulk, ovens

Sulphate of ammonia	$44-$47
Birmingham area	45.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
l.c.l. drums	19.50

FLUORSPAR

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $44; 70%, $42.50; 60%, $38. Imported, net ton, duty paid, metallurgical grade, $35-$36.

ELECTRODES

(Threaded with nipple, unboxed f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Per 100 lb
2	24	$43.50
2½	30	28.00
3	40	27.25
4	40	26.00
5½	40	25.75
6	60	23.25
7, 8, 9, 10	60	21.00
12, 14	72	20.50
16	72	20.00
17	60	20.50
18	72	20.50
20	72	20.00

CARBON

40	100	$8.95
40, 35, 30	110	8.95
30	84	9.10
24	96	8.90
24	72, 84	9.10
20	90	8.95
20	84	9.10
17	72	9.10
17	60	9.50
14	72	9.50
14, 12, 10	60	10.30
8	60	10.55

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AIR HAMMER EVER MADE

THE APPTON SUPER 7 HAMMER

STARTS and STOPS Automatically!

a GIANT for POWER
a DWARF in SIZE

NO Recoil!
NO Servicing!
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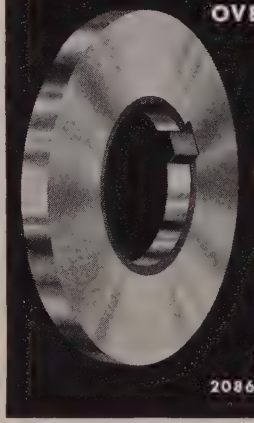

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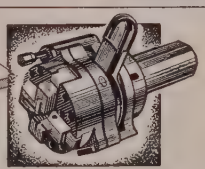

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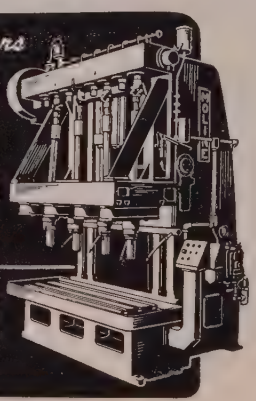

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69 illustrations Price $5.00 Postpaid

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Book Department, 1213 W. 3rd St., Cleveland 13, O.

(*Concluded from page* 161)

300 tons, also 25 tons steel ribs and plates, Wanship dam, Weber Basin project; bids to Bureau of Reclamation, Ogden, Utah, June 10.

310 tons, two Washington state highway bridges, Lewis county; general contract to Neukirch Bros., Seattle, low $239,597.

55 tons, also miscellaneous steel, repairs to Bonneville dam; bids to U. S. Engineer, Portland, Oreg., June 1.

PLATES . . .

PLATES PLACED

560 tons, water storage tanks, American Water Works Service Co., East St. Louis, Ill., to Chicago Bridge & Iron Works, Chicago.

PLATES PENDING

500 tons or more, several storage tanks, Mountain Home, Idaho, air base; bids to U. S. Engineer, Walla Walla, Wash., advanced four weeks from May 19.

100 tons, replacement of 250,000-gallon tank, naval station, Norfolk, Va.; bids June 1.

PIPE . . .

CAST IRON PIPE PLACED

765 tons, 20-inch, water system, airfield base, Portsmouth, N. H., to American Cast Iron Pipe Co., Birmingham; Verrier Construction Co., Portland, Me., contractor.

700 tons, 6 to 12-inch, Lexington, Mass., to Warren Pipe & Foundry Co., Everett, Mass.

425 tons, 4 and 6 in. for Powell Valley Road District, Portland, Oreg., to U. S. Pipe & Foundry Co., Seattle.

225 tons, 6 and 8-inch, Lewiston, Me., to Warren Pipe & Foundry Co., Everett, Mass.

115 tons, 8-inch, Arlington, Mass., to Warren Pipe & Foundry Co., Everett, Mass.

100 tons, 6-inch, Metropolitan District Commission, Hartford, Conn., to United States Pipe & Foundry Co., Burlington, N. J.

CAST IRON PIPE PENDING

1600 tons, 30-in. pipe, involving 9240 lineal ft, of which 7000 ft are for Harrisburg, Pa., and 2240 ft for Painesville, O., pending.

775 tons, 24-inch, Westfield, Mass.; bids in.

530 tons, low pressure pipe for steam service, comprising 1000 lineal ft each of 42, 48, 60 and 72-in. outside diameter pipe, Belfield Co., Philadelphia; bids asked.

237 tons, 6 to 12 in.; bids to Pendleton, Oreg., June 2.

110 tons, 6 and 8-inch, Quincy, Mass.; bids in.

100 tons, 6 to 12 in.; bids opened at Tacoma, Wash., May 17.

100 tons, various sizes; bids opened by Beaverton, Oreg., May 17.

77 tons, 6 in., bids to Kent, Wash., Charles Bridges, clerk, June 7; also 40 tons 12 in., bids to Dishman, Wash., May 24.

STEEL PIPE PLACED

3500 tons, 26 miles, 20 and 16-in., mill rolled, ¼ in. thickness, to Kaiser Steel Corp., Napa, Calif., by Trans-Mountain Oil Pipe Line Co., Vancouver, B. C. for oil supply line, Sumas, Wash., to Ferndale, Wash., refinery General Petroleum Co.

165 tons, 8 in. gas supply, Seattle Gas Co. system expansion, to Consolidated Western Steel Corp., Seattle.

RAILS, CARS . . .

LOCOMOTIVES PENDING

New York Central, 62 diesel switching units; contemplated.

Western Railways of Cuba, six 800-hp diesel units; pending.

RAILROAD CARS PLACED

Louisiana & Arkansas, 250 seventy-ton pulp wood cars, to Pullman-Standard Car Mfg. Co., Chicago.

Union Tank Car Co., 50 fifty-ton tank cars to own shops.

RAILROAD CARS PENDING

Western Railways of Cuba, 25 hopper-type ballast cars; pending.

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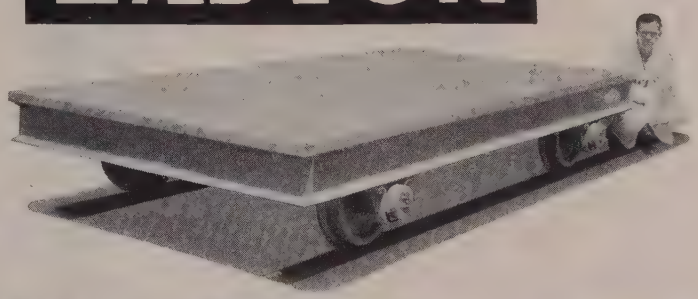

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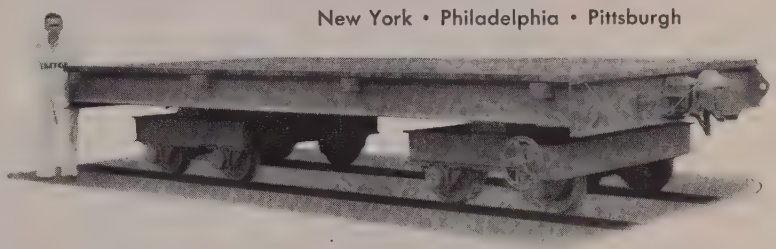

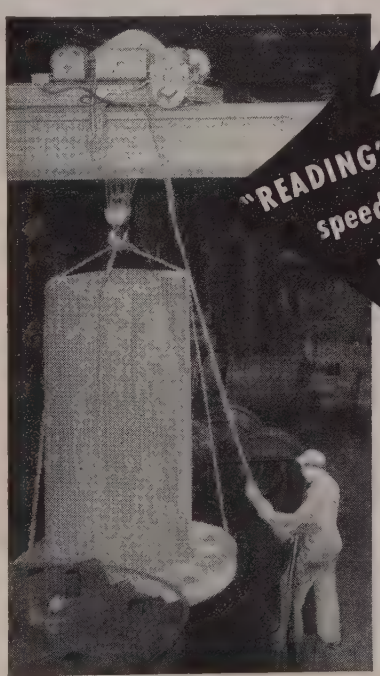

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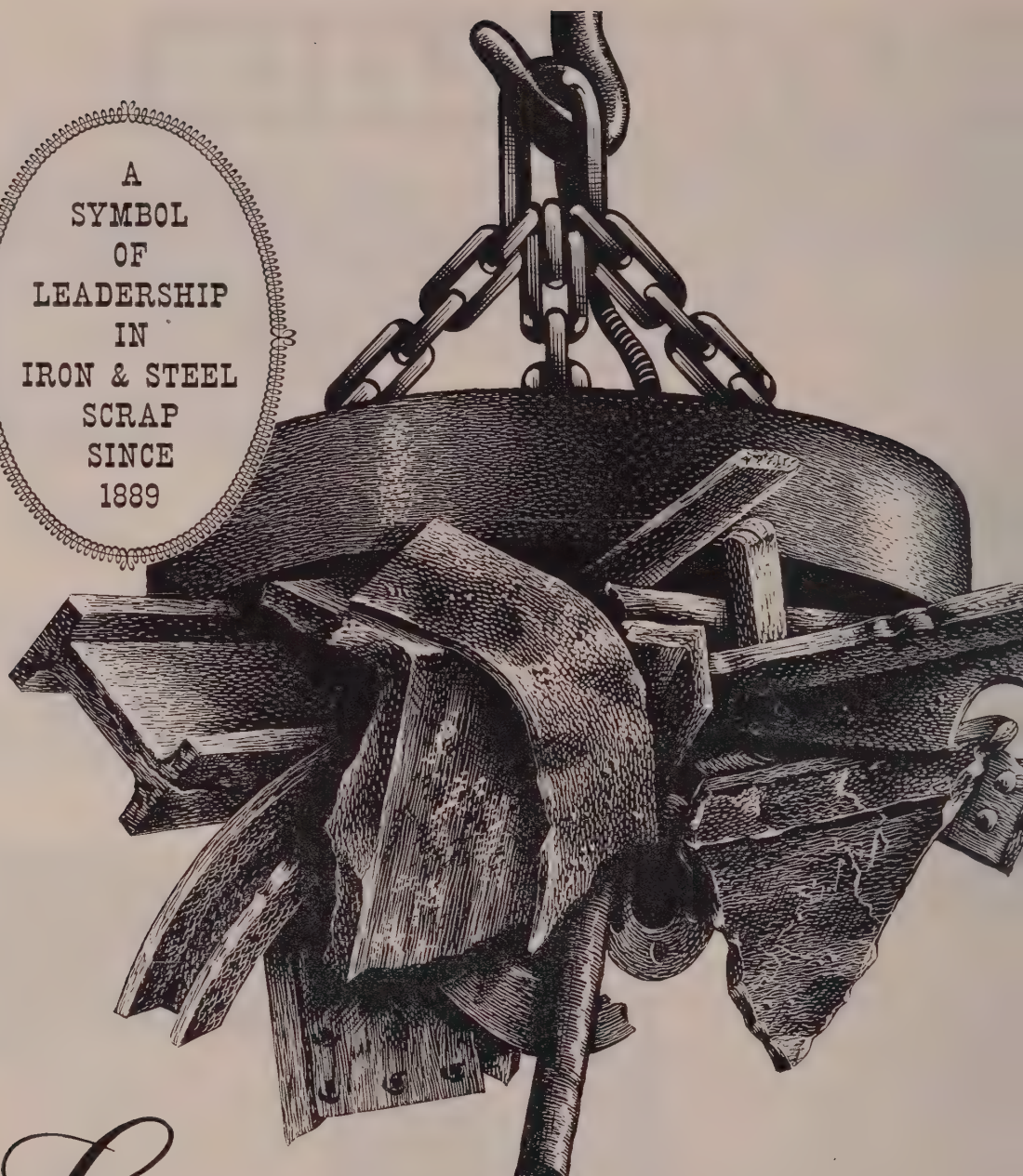

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Scrap Continues Advance At Some Points

Trading spotty at most consuming centers with steel mills restricting purchases largely to token tonnages. Price rise on dealer material reflects better trade sentiment

Scrap Prices, Page 166

Chicago — A rising scrap market continues here and it derives support to some extent from steelmaking operations which have moved up for three consecutive weeks. Open hearth scrap is up $1 per gross ton to $32 for No. 1 heavy melting, $30 for No. 2, $33 for No. 1 factory bundles and $31 for No. 1 dealer bundles. Turnings grades are up $1 a ton too in recent sales.

Philadelphia—Trading in steel scrap is still spotty, and while there are no changes in the major grades, sentiment is a bit easier. The local market has shown strength over the past few weeks, but not comparable to that manifested in Pittsburgh and certain midwestern districts. This has proved disappointing to sellers who are offering material a little more freely, although they are not offering concessions under recent levels. In fact, in machine shop turnings there has been an increase of $1 to $13 per ton, delivered consumer plant.

Boston — Prices were surprisingly high for steel scrap offered in the 625-ton Watertown arsenal opening, 200 tons being withdrawn. For unprepared steel, 250 tons, $15.58 per gross ton was offered.

Steel scrap buying by district consumers is light.

Youngstown — Scrap prices have moved up here again, mainly on the basis of strength in other areas. No. 1 bundles and No. 1 heavy melting scrap are reportedly quoted around $29 to $30 a ton, with No. 2 bundles around $26 to $27.

Cleveland—Scrap prices are holding steady here at the higher levels established earlier in the month, despite absence of new mill buying. Brokers are of the opinion that the recent upward push was no "flash in the pan" and that the market will hold at least through June.

Buffalo—Strength dominates scrap market trading here as the recent prolonged lull in the market was broken with prices advancing $1.50 to $2 a ton on steelmaking and cast grades. A leading mill bought No. 2 heavy melting and No. 2 bundles at higher levels.

Pittsburgh—With steady demand for good quality scrap, price of No. 1 heavy melting moved up to $30 to $31 early last week. Sales of other grades remained level. With only scattered sales of No. 2 bundles reported, that grade failed to respond to the general upward price trend.

Cincinnati — Cast grades show strength with three items up $1 a ton. Charging box cast and heavy breakable cast advanced to $36, while drop broken machinery climbed to $46.

Detroit—Scrap prices here remain unchanged though a possible increase could be forthcoming when automotive lists close this week.

Washington—Consumption of ferrous scrap during March increased 6 per cent over that in February, but daily consumption decreased 4 per cent because of the longer month, reports the Bureau of Mines.

Pig iron consumption increased 2 per cent over February, with daily consumption 8 per cent down.

Total melt of ferrous materials, scrap and pig iron, was 9,006,000 gross tons in March, comprised of 51.5 per cent scrap and 48.5 per cent pig iron. This compares with 50.5 per cent and 49.5 per cent, respectively in February.

Scrap available for consumption in March was 4,556,000 gross tons, 6 per cent greater than in February. Home scrap accounted for 2,840,000 tons and purchased scrap 1,716,000 tons. Of the purchased scrap 80 per cent was received from dealers and 20 per cent from other sources.

Stocks of ferrous scrap held by consumers totaled 6,082,000 gross tons.

New York—Scrap brokers' buying prices are unchanged throughout the list, with the general tone steady, but not quite as strong as recently. Modest buying of steel scrap by eastern Pennsylvania and Pittsburgh consumers continues.

Birmingham — Strengthening tendency is reported here in the scrap market despite the absence of volume bookings.

St. Louis—Scrap prices have moved up but buying remains selective. Rails were posted $1.50 to $3 higher, while No. 1 melting steel went up $1. Local buying remains slow.

(*Please turn to page* 168)

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IRON AND STEEL SCRAP

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. Changes shown in ita

STEELMAKING SCRAP COMPOSITE

May 19	$28.33
May 13	27.67
Apr. Avg.	25.67
May, 1953	39.17
May, 1949	22.29

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer plant)

No. 1 heavy melting	*30.00-31.00*
No. 2 heavy melting	*28.00-29.00*
No. 1 bundles	*30.00-31.00*
No. 2 bundles	25.00-26.00
No. 1 busheling	*30.00-31.00*
Machine shop turnings	14.00-15.00
Mixed borings, turnings	14.00-15.00
Short shovel turnings	19.00-20.00
Cast iron borings	19.00-20.00
Cut structurals	30.00-31.00
Heavy turnings	26.00-27.00
Punchings & plate scrap	*32.00-33.00*
Electric furnace bundles	31.00-32.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Charging box cast	33.00-34.00
Heavy breakable cast	30.00-31.00
Unstripped motor blocks	24.00-25.00
No. 1 machinery cast	43.00-44.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00
Rails, 2-ft. and under	44.00-45.00
Rails, 18-in. and under	45.00-46.00
Rails, random lengths	38.00-39.00
Railroad specialties	34.00-35.00

Stainless Steel Scrap
(F.o.b. shipping point)

18-8 bundles & solids	165.00-170.00
18-8 turnings	85.00-90.00
430 bundles & solids	65.00-70.00
430 turnings	50.00-52.00

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting	28.00-29.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	28.00-29.00
No. 2 bundles	21.00-22.00
No. 1 busheling	28.00-29.00
Machine shop turnings	12.00-13.00
Mixed borings, turnings	16.00-17.00
Short shovel turnings	16.00-17.00
Cast iron borings	16.00-17.00
Low phos.	26.00-27.00
Cut structural plate 2 ft and under	34.00-35.00
Alloy free, short shovel turnings	16.50-17.50
Electric furnace bundles	26.00-27.00

Cast Iron Grades

No. 1 cupola	41.00-42.00
Charging box cast	27.50-28.50
Stove plate	36.50-37.50
Heavy breakable cast	26.50-27.50
Unstripped motor blocks	25.50-26.50
Brake shoes	30.50-31.50
Clean auto cast	43.00-44.00
No. 1 wheels	33.50-34.50
Burnt cast	31.50-32.50
Drop broken machinery	43.00-44.00

Railroad Scrap

No. 1 R.R. heavy melt.	31.00-32.00
R.R. malleable	41.00-42.00
Rails, 3-ft. and under	44.00-45.00
Rails, 18 in. and under	47.00-48.00
Rails, random lengths	40.00-41.00
Cast steel	34.00-35.00
Railroad specialties	35.00-36.00
Uncut tires	36.00-37.00
Angles, splice bars	42.50-43.50
Rails, rerolling	42.00-43.00

Stainless Steel
(F.o.b. shipping point)

18-8 bundles, solids	nom. 160.00-170.00
18-8 turnings	nom. 70.00-80.00
430 clips, bundles, solids	nom. 70.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer plant)

No. 1 heavy melting	29.00-30.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	29.00-30.00
No. 2 bundles	22.00-23.00
Machine shop turnings	13.00-14.00
Short shovel turnings	19.00-20.00
Cast iron borings	19.00-20.00
Low phos.	30.00-31.00
Electric furnace bundles	29.00-30.00

Railroad Scrap

No. 1 R.R. heavy melt.	31.00-32.00

PHILADELPHIA

(Delivered consumer plant)

No. 1 heavy melting	23.00
No. 2 heavy melting	21.00
No. 1 bundles	24.00
No. 2 bundles	19.00
No. 1 busheling	23.00
Electric furnace bundles	25.00
Machine shop turnings	*13.00*
Mixed borings, turnings	15.00
Short shovel turnings	17.00
Structurals & plate	29.00
Heavy turnings	22.00
Couplers, springs, wheels	31.00
Rail crops, 2 ft & under	41.00

Cast Iron Grades

No. 1 cupola	*35.00-36.00*
Malleable	39.00
Heavy breakable cast	*35.50*
Unstripped motor blocks	28.00*
Drop broken machinery	41.00

*Nominal.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	17.00-18.00
No. 2 heavy melting	15.00-16.00
No. 1 bundles	17.00-18.00
No. 2 bundles	13.00-14.00
Machine shop turnings	5.50-6.00
Mixed borings, short turnings	7.50-8.00
Low phos. (structural & plate)	21.00-22.00
Short shovel turnings	10.00-10.50

Cast Iron Grades

No. 1 cupola	29.00-30.00
Unstripped motor blocks	21.00-22.00*

Stainless Steel

18-8 sheets, clips, solids	165.00-170.00
18-8 borings, turnings	70.00-75.00
430 sheets, clips, solids	40.00
410 sheets, clips, solids	30.00

*Nominal.

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*17.00*
No. 2 heavy melting	15.25-16.00
No. 1 bundles	*17.00*
No. 2 bundles	13.25-14.25
Machine shop turnings	3.00-3.50
Mixed borings, turnings	5.50-6.00
Short shovel turnings	7.25-7.50
No. 1 cast	29.00-30.00
Mixed cupola cast	27.00-28.00
No. 1 machinery cast	32.00-33.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	25.00-26.00
No. 2 heavy melting	22.00-23.00
No. 1 bundles	25.00-26.00
No. 2 bundles	19.00-20.00
No. 1 busheling	25.00-26.00
Machine shop turnings	11.00-12.00
Mixed borings, turnings	13.50-14.50
Short shovel turnings	13.50-14.50
Cast iron borings	13.50-14.50
Low phos., 18-in.	33.00-34.00

Cast Iron Grades

No. 1 cupola	38.00
Heavy breakable cast	*36.00*
Charging box cast	*36.00*
Drop broken machinery	*46.00*

Railroad Scrap

No. 1 R.R., heavy melt.	29.00-30.00
Rails, 18-in. and under	44.00-45.00
Rails, random lengths	37.00-38.00

CHICAGO

No. 1 heavy melting	*31.00-32.00*
No. 2 heavy melting	*29.00-30.00*
No. 1 factory bundles	*32.00-33.00*
No. 1 dealer bundles	*30.00-31.00*
No. 2 bundles	22.00-23.00
No. 1 busheling	*31.00-32.00*
Machine shop turnings	*14.00-15.00*
Mixed borings, turnings	*14.00-15.00*
Short shovel turnings	*16.00-17.00*
Cast iron borings	*16.00-17.00*
Cut structurals, 3-ft	32.00-33.00
Punchings & plate scrap	32.00-33.00
Electric furnace bundles	*33.00-34.00*

Cast Iron Grades

No. 1 cupola	38.00-39.00
Stove plate	*32.00-34.00*
Unstripped motor blocks	24.00-25.00
Clean auto cast	40.00-42.00
Drop broken machinery	41.00-42.00

Railroad Scrap

No. 1 R.R., heavy melt	*33.00-34.00*
R.R. malleable	40.00-42.00
Rails, 2-ft. and under	44.00-45.00
Rails, 18-in. and under	45.00-46.00
Angles, splice bars	*38.00-39.00*
Rails, rerolling	41.00-43.00

Stainless Steel Scrap

18-8 clips & solids	130.00-140.00
18-8 turnings	60.00
430 clips & solids	40.00-42.00
430 turnings	20.00-22.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	21.00
No. 2 heavy melting	19.00
No. 1 bundles	23.00
No. 2 bundles	19.00
No. 1 busheling	21.50
Machine shop turnings	10.00
Mixed borings, turnings	10.00
Short shovel turnings	11.50
Punchings & plate scrap	24.00

Cast Iron Grades

No. 1 cupola	36.00
Charging box cast	27.00
Stove plate	29.00
Heavy breakable	26.00
Unstripped motor blocks	18.00
Clean auto cast	40.00
Malleable	28.00

BUFFALO

No. 1 heavy melting	25.00-26.00
No. 2 heavy melting	*21.00-22.00*
No. 1 bundles	25.00-26.00
No. 2 bundles	*19.00-20.00*
No. 1 busheling	*25.00-26.00*
Machine shop turnings	14.00-15.00
Mixed borings, turnings	16.50-17.00
Short shovel turnings	17.50-18.00
Cast iron borings	16.50-17.00
Low phos.	27.50-28.50

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	*39.00-40.00*
No. 1 machinery	*41.00-42.00*

Railroad Scrap

Rails, random lengths	33.00-34.00
Rails, 3-ft and under	40.00-41.00
Railroad specialties	34.50-35.50

BIRMINGHAM

No. 1 heavy melting	19.00-20.00
No. 2 heavy melting	22.00-23.00
No. 1 bundles	19.00-20.00
No. 2 bundles	15.00-16.00
No. 1 busheling	19.00-20.00
Cast iron borings	13.00-14.00
Short shovel turnings	14.00-15.00
Machine shop turnings	12.00-13.00
Electric furnace bundles	25.00-26.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	42.00-43.00
Charging box cast	28.00-29.00
Stove plate	39.00-40.00
Bar crops and plate	28.00-29.00
Structural, plate 2 ft.	28.00-29.00
Heavy breakable cast	28.00-29.00
Unstripped motor blocks	32.00-33.00
No. 1 wheels	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	26.00-27.00
Rails, 18-in. and under	39.00-40.00
Rails, random lengths	34.00-35.00
Rails, rerolling	34.00-35.00
Angles, splice bars	36.00-37.00
Stand. steel axles	35.00-36.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	2
No. 2 heavy melting	2
No. 1 bundles	2
No. 2 bundles	2
Machine shop turnings	1
Short shovel turnings	1

Cast Iron Grades

No. 1 cupola	3
Charging box cast	2
Heavy breakable cast	2
Unstripped motor blocks	2
Brake shoes	3
Clean auto cast	3
Stove plate	3

Railroad Scrap

No. 1 R.R. heavy melt	3
Rails, 18-in. and under	4
Rails, random lengths	3
Rails, rerolling	4
Uncut tires	3
Angles, splice bars	3

SEATTLE

(Delivered consumer plant)

No. 1 heavy melting	2
No. 2 heavy melting	1
No. 1 bundles	2
No. 2 bundles	1
No. 3 bundles	1
Machine shop turnings	1
Mixed borings, turnings	1
Short shovel turnings	1
Electric furnace, No. 1	3

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	30.00-3
Heavy breakable cast	2
Unstripped motor blocks	2
No. 1 wheels	2
Stove plate (f.o.b. plant)	2
Brake shoes	2

Railroad Scrap
(Delivered consumer plant)

Rails, random lengths	30.00-3

SAN FRANCISCO

No. 1 heavy melting	2
No. 2 heavy melting	1
No. 1 bundles	1
No. 2 bundles	1
No. 1 busheling	2
Machine shop turnings	
Mixed borings, turnings	
Short shovel turnings	
Cast iron borings	
Cut structurals	2
Heavy turnings	
Punchings & plate scrap	2
Electric furnace bundles	1

Cast Iron Grades

No. 1 cupola	*40.00-4*
Charging box cast	3
Stove plate	3
Heavy breakable cast	3
Unstripped motor blocks	2
Brake shoes	3
Clean auto cast	3
No. 1 wheels	3
Burnt cast	2
Drop broken machinery	4

LOS ANGELES

No. 1 heavy melting	2
No. 2 heavy melting	1
No. 1 bundles	1
No. 2 bundles	1
Machine shop turnings	

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	4

HAMILTON, ONT.

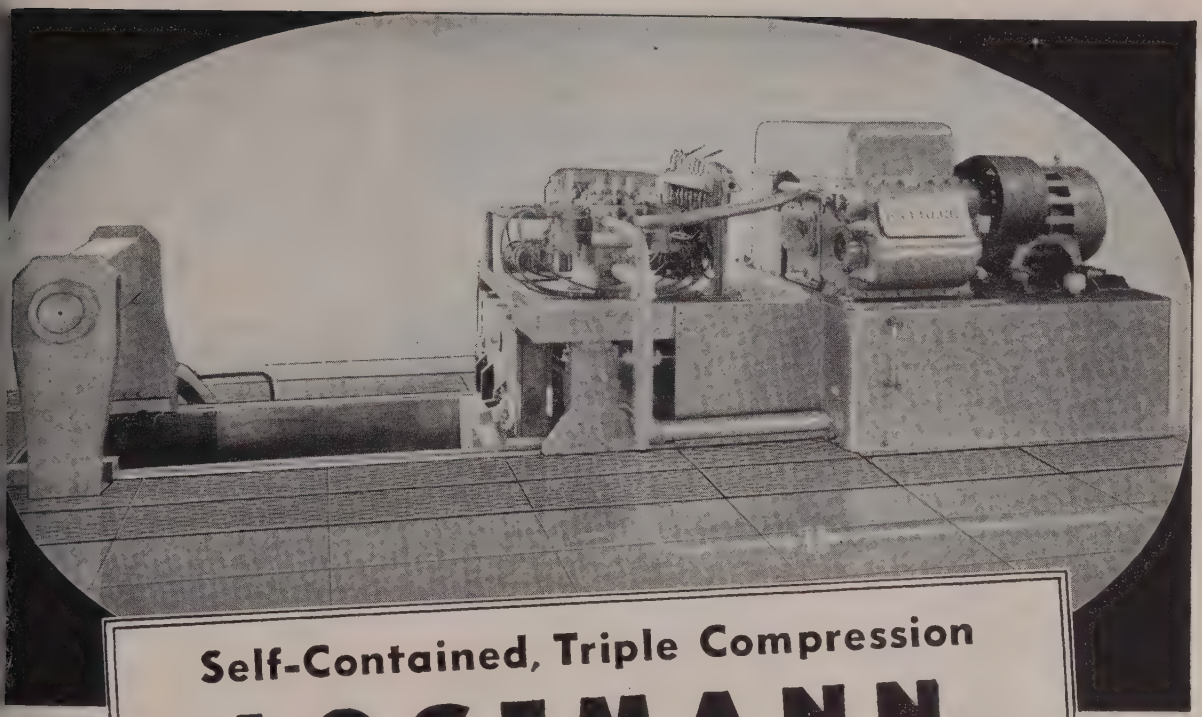
(Delivered prices)

No. 1 heavy melting	$2
No. 2 heavy melting	
No. 1 bundles	
No. 2 bundles	
Mixed steel scrap	
Mixed borings, turnings	
Rails, remelting	
Busheling, new factory: Prepared	
Unprepared	
Short steel turnings	

Cast Iron Grades†

No. 1 machinery cast	42.00-

†F.o.b., shipping point.



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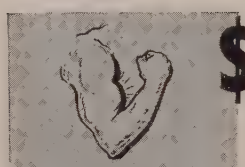

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(*Concluded from page* 165)

Los Angeles—Dealers report t mill demand, depressed since Dece ber, shows signs of improvement. creased quantities of machine tu ings are moving at $5 delivered.

Seattle—Executives of scrap co panies report more life in the m ket although price increases in ea ern centers have not yet reach the coast but are expected wit 90 days.

San Francisco—No. 1 cupola c moved up another notch last we the new quotation going to $40 $42 a ton.

Ship More Steel by Water

Boston—More finished steel is m ing into New England by water fr Baltimore. Two 2500-ton shipme recently docked at Portland, M from the Sparrows Point mill.

Reinforcing Bars . .

Reinforcing Bar Prices, Page 146

Boston—Heavier inquiry for c crete reinforcing bars centers highway and bridge tonnage. Scho and airfield base construction a accounts for substantial tonnage.

Seattle—Rolling mill operations unchanged, smaller plants being gaged at capacity and Bethleh Steel at about 70 per cent.

Tubular Goods . . .

Tubular Goods Prices, Page 149

Youngstown — Sawhill Tubul Products Inc. will move its Spri field, O., plant to Wheatland, Pa. equipment will be installed at Whe land by July 11.

Boston — Buttweld and seaml pipe bookings are heavier than April, increase this month being largely to direct shipments. Mercha pipe and tubing distributors pl stock orders cautiously.

Pittsburgh—Seasonal gain in sa of mechanical tubing continu Those sales and demand for oil co try goods are bright spots in a g erally-dull tubular market. Sales standard seamless and welded gra remain slow, at last month's lev

Seattle—More than 3500 tons of and 16-inch electric resistant, stress steel pipe will be furnished by Kai Steel Co., for the oil supply line ing laid from Sumas to Fernda Wash.

The Seattle Gas Co. in an exte sion program is laying 12,400 f of 8-inch distribution pipe, 165 to furnished by Consolidated Weste Steel Corp.

Vancouver, B. C.—Canadian We ern Pipe Mills, Ltd., plans a $4 m lion steel pipe plant near here.

ig Iron . . .

Pig Iron Prices, Page 150

Boston—With the melt barely hold-, pig iron consumers are not in-easing releases and few foundries e taking allotted tonnage through ntract with the district producer. achine tool requirements have pped, but the big dent in demand from textile mill equipment shops.

New York—While there is no im-provement in pig iron buying, with siness spotty and restricted, there at least no further falling off. llers anticipate a fairly steady mar-t for the next few weeks, then ssibly a decline when the vaca-n and hot weather season sets in.

Philadelphia—Pig iron demand re-cts little change. Buying is spotty, th volume limited, and some trade rces look for a further drop be-e any appreciable upturn comes.

Pittsburgh — U. S. Steel Corp. nked the No. 1 blast furnace at Edgar Thomson Works, not re-ring the iron. Merchant pig iron pments are slow.

Cleveland—Merchant pig iron is ving to consumers at sluggish ce. Spotty foundry operations are conducive to active buying. ne foundries are engaged at rela-ely high level and are taking in n steadily.

Cincinnati—Foundries now believe chances of a strong pickup in siness have faded as the vacation son approaches. Better business, it comes, will arrive in August.

Chicago — Demand and consump-n of pig iron in this area show d improvement and indications May will approximate March ume. Foundry operations are tty, ranging from 3 to 5 days a ek.

Inland Steel Co. blew in an addi-nal blast furnace at its Indiana rbor plant last week to bring total st furnace operation to 7. The mpany has 8 stacks with total rat-capacity of 2,638,950 tons of pig n annually. The reactivated stack s been banked since Feb. 13. An rease in scrap prices since that e is said to make it more eco-nical for the company to increase iron ratio to scrap in its steel lt.

St. Louis—Pig iron ground stocks ve dropped 25 to 30 per cent here ce Jan. 1, mostly since April. The ver stock is ample, however, for luced foundry demand.

Los Angeles—Foundry order back-s extend to five weeks, with most lters operating at 85 per cent of pacity.

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Link Belt Co. 5'2" x 16'
No. 502-16, with all auxiliary equipment—Roto Louvre type.
Reply Box 973, STEEL
Penton Bldg. Cleveland 13, Ohio

FOR SALE
Five-Ton Hyster Karry Krane—9 Ft. 8 Ins. Boom Height, Hercules 4-Cylinder, 40-HP, Water-Cooled Engine. Had very little usage and practically in new condition. Available for inspection at our Detroit Plant, 21000 Hoover Road, Van Dyke, Michigan.
BLISS & LAUGHLIN, INC.
HARVEY, ILLINOIS

CLASSIFIED

Representatives Wanted

WELL KNOWN MANUFACTURER of specialized industrial furnaces (electric-gas-oil) desires commission sales representative in Cleveland tri-state Area. Excellent opportunity for a good sales engineer. Reply Box 968, STEEL, Penton Building, Cleveland 13, Ohio.

Positions Wanted

EXPERIENCED STAFF MAN AVAILABLE to serve plant management for improved steel quality, production planning, processing and/or manufacturing cost reduction. Capable, with proven record to direct steel production operations and flat rolling conversions with safe, profitable, customer service leadership. Reply Box 967, STEEL, Penton Building, Cleveland 13, Ohio.

PLANT MANAGER—M.I.T. Engineering Graduate with Proven Record in Supervision, Production, Tooling, Cost Reduction, Methods Improvement and Related Functions. Reply Box 949, STEEL, Penton Building, Cleveland 13, Ohio.

SALES APPLICATION ENGINEER
M.E. Graduate. Process and cost production engineer. 18 years' experience contacting industrial and distributor accounts. Northern Ohio first choice. Age 39. Reply Box 971, STEEL, Penton Building, Cleveland 13, Ohio.

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FOR SALE
Used — As Is — Reconditioned
RAILWAY CARS—
ALL TYPES
"SERVICE-TESTED"
FREIGHT CAR REPAIR PARTS
For All Types of Cars
LOCOMOTIVES
Diesel, Steam, Gasoline
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RAILWAY TANK CARS
STORAGE TANKS
6,000—8,000 and 10,000-Gallon
Cleaned and Tested
CRANES
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RAILS
New or Relaying
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—FOR SALE—
GRAY IRON CASTINGS
OPEN CAPACITY
Burner Castings
Floor Jobs and Bumper Jobs
Phone—Belleville 215
ENTERPRISE FOUNDRY, INC.
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Set solid	50 words or less, $15.00, each additional word .30
All capitals	50 words or less, $19.20, each additional word .38
All caps, leaded	50 words or less, $23.40, each additional word .47

POSITIONS WANTED

Set solid	25 words or less, $3.60, each additional word .14
All capitals	25 words or less, $4.50, each additional word .18
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Displayed classified rates on request
Address your copy and instructions to

STEEL
PENTON BUILDING CLEVELAND 13, OHIO

when the job is tough . . .

USE "HARD-DUR" GEARS

they preserve the tooth form

• "HARD-DUR" Gears not only preserve tooth form because the material is highly wear resistant and the gears are scientifically heat treated to obtain maximum physical properties...but they have involute teeth that are produced to high standards of accuracy by very careful workmanship. In fact "HARD-DUR" Gears are so much stronger, harder and more wear-resistant, that they are guaranteed to have at least four or five times the life of similar untreated gears...and at only 50% extra in cost.

THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 HAMILTON AVE. • CLEVELAND 14, OHIO, U. S. A.

Send note on Company Letterhead for 488-Page Catalog 49

Advertising Index

Aeroquip Corporation
Aetna-Standard Engineering Co., The Inside Front Co
Allegheny Ludlum Steel Corporation
Aluminum Company of America 17, 18, 19,
American Chain & Cable, Page Steel & Wire Division
American Chemical Paint Co. 44,
American Hot Dip Galvanizers Association
American Zinc, Lead & Smelting Co.
American Zinc Sales Co.
Association of Iron & Steel Engineers
Atkins Saw Division, Borg-Warner Corporation

Bailey, William M., Co.
Belmont Iron Works, The
Bethlehem Steel Co.
Blanchard Machine Co., The
Bliss & Laughlin, Inc.
Borg-Warner Corporation, Atkins Saw Division
Boston Gear Works 28,

Century Electric Co.
Chandler Products Corporation
Cincinnati Milling Machine Co., The
Cincinnati Shaper Co., The
Cities Service Oil Co.
Cleveland Cap Screw Co., The
Cleveland Crane & Engineering Co., The
Cleveland Steel Tool Co., The
Consolidated Industries, Inc.
C-O-Two Fire Equipment Co.
Cowles Tool Co.
Cross Co., The
Crucible Steel Company of America 22,

Danly Machine Specialties, Inc. 112,
Dempster Brothers
Denison Engineering Co., The
Detroit Stamping Co.
Dulien Steel Products, Inc.

Eastern Machine Screw Corporation, The
Easton Car & Construction Co.
Eaton Manufacturing Co., Reliance Division
Edison, Thomas A., Inc., Edison Storage Battery Division
Emhart Mfg. Co., Henry & Wright Division
Enterprise Galvanizing Co.
Euclid Crane & Hoist Co., The

Farrell-Cheek Steel Co.
Federal Products Corporation
Felters Co., The
Foote Bros. Gear & Machine Corporation

General Electric Co.
Gray Iron Founders' Society, Inc.

eat Lakes Steel Corporation 68
lf Oil Corporation 42, 43
lf Refining Co. 42, 43

rnischfeger Corporation, Welding Division .. 34
ald Machine Co., The 2
nry & Wright Division of Emhart Mfg. Co.. 7
nes, Charles A., Inc. 160
rsburgh & Scott Co., The 170
ughton, E. F., & Co. 117
bbard, M. D., Spring Co. 162
dropress, Inc., Loewy Rolling Mill Division 21

nois Tool Works 119
and Steel Co. 54
ernational Nickel Co., Inc., The 50
n & Steel Products, Inc. 169

nes & Laughlin Steel Corporation 91, 135

arney & Trecker Corporation 81
ystone Steel & Wire Co. 10

mson & Sessions Co., The 129
pointe Machine Tool Co., The 26
vallee & Ide, Inc. 75
ewy Rolling Mill Division, Hydropress, Inc. 21
gemann Brothers Co. 167
ria Brothers & Co., Inc. 164

clnnes Steel Co. 138

aster Electric Co., The ..... Inside Back Cover
athews Conveyer Co. 12
atthews, Jas. H., & Co. 160
esta Machine Co. 64
chigan Crane & Conveyor Co. 165
oline Tool Co. 162
orse Chain Co. 132

tional-Standard Co., Reynolds Wire Division 82
tional Steel Corporation 68
w Jersey Zinc Co., The 71
elsen, E. V., Inc. 162

io Locomotive Crane Co., The 160
Neil-Irwin Manufacturing Co. 16
born Manufacturing Co., The 3
tawa Steel Products, Inc. 74

Page Steel & Wire Division, American Chain & Cable 157
Pennsylvania Flexible Metallic Tubing Co., Inc. 32
Pittsburgh Gear Co. 111
Pittsburgh Steel Co. 14, 15

Reading Crane & Hoist Corporation 163
Reliance Division, Eaton Manufacturing Co... 87
Republic Steel Corporation, Alloy Steel Division 25
Republic Steel Corporation, Steel & Tubes Division 155
Revere Copper & Brass, Inc. 103
Reynolds Wire Division, National-Standard Co. 82
Russell, Burdsall & Ward Bolt & Nut Co. 72
Rust Furnace Co. 85
Ryerson, Joseph T., & Son, Inc. 46

Sargeant & Wilbur, Inc. 5
Seaboard Screw Corporation 160
Service Steel 162
Simonds Saw & Steel Co. 45
Snyder Tool & Engineering Co. 107
Steel & Tubes Division, Republic Steel Corporation 155
Sterling Bolt Co. 105
Sterling Wheelbarrow Co. 168
Sun Oil Co., Industrial Products Department 76

Tennessee Products & Chemical Corporation . 4
Thomas Flexible Coupling Co. 134
Thomas Machine Manufacturing Co. 159
Timken Roller Bearing Co., The ..... Back Cover
Townsend Co. 124, 125

Udylite Corporation, The 38
Union Metal Manufacturing Co., The 128
United Engineering & Foundry Co. 37
United States Pipe & Foundry Co., Special Products Division 8, 9
United States Steel Corp., Subsidiaries 126
United States Steel Supply Division, United States Steel Corporation 126

Ward Steel Co. 171
Washington Steel Corporation 27
Wheland Co., The 171
Whiting Corporation 88

Yale & Towne Manufacturing Co., The 49
Yoder Co., The 30
Youngstown Foundry & Machine Co., The ... 94

~ ~ ~

Table of Contents, Page 5

Classified Advertising, Page 169

QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866

THE WHELAND COMPANY

CHATTANOOGA 2, TENN.

WARD STEEL CO.

We specialize in
FINISHED STEEL
BARS—TUBES—STRIP

PROMPT WAREHOUSE SERVICE ONLY

Most Complete Stock in America of
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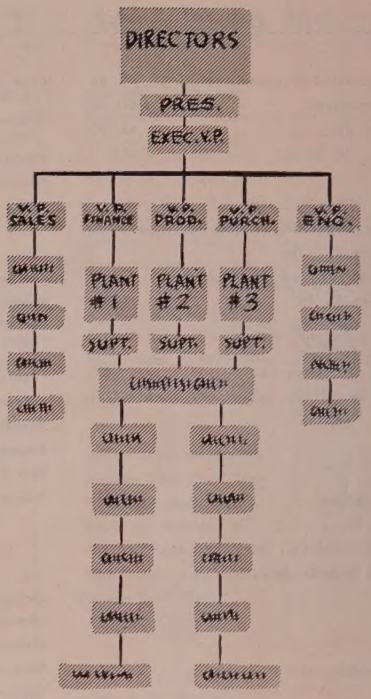
Branches:
3042-3058 W. 51st Street, CHICAGO, ILL.
Phone: Grove Hill 6-2600

Fenner Street, Providence, R. I.
Phone: Gaspee 1-5573, 1-8573

How much SALES POWER does it take today?



Selling to industries isn't what it used to be.

For every worthwhile plant a dozen years ago, you now have two, three, or four to be contacted. Inside the plants, the picture has changed, too. Growth has greatly expanded the number of men who have something to say about the selection or rejection of your products.

You may say, "Oh, we've doubled our sales force to take care of this!" But even a doubled sales force may not be a match for the size and complexity of today's industrial selling job.

Add to this the tougher competition you're up against and you can see why it takes a whale of a lot more SALES POWER now.

It isn't *number* of salesmen alone that determines your SALES POWER. It's the calibre of men—their training —their enthusiasm for your products—and how we their contact time is matched to the real sales potentia

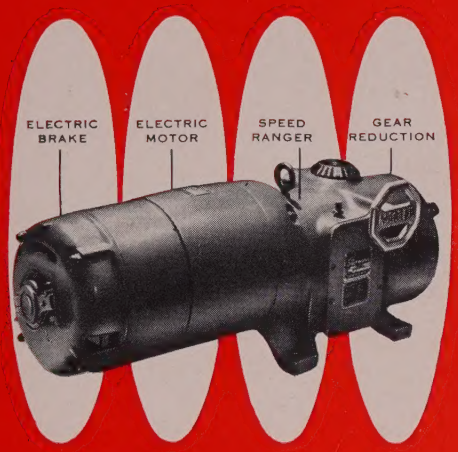
With all these things at their best, your sales force ca personally contact only a fraction of the vast parad of buying influences constantly moving through indu try's key positions.

It's the advertising support you give your salesmen tha multiplies their effectiveness by making your produc wanted in more plants. It's this advertising suppo that pipes information about your products to far mo key men than your salesmen can ever contact personall

It's this advertising support, adequately related to th size of your selling job, that steps up your SALE POWER and increases the productivity of your sal force. Whether your advertising program is adequat to today's selling job, is something your advertisi agency can best help you evaluate.

THE **PENTON** PUBLISHING COMPANY

PENTON BUILDING • CLEVELAND 13, OHIO



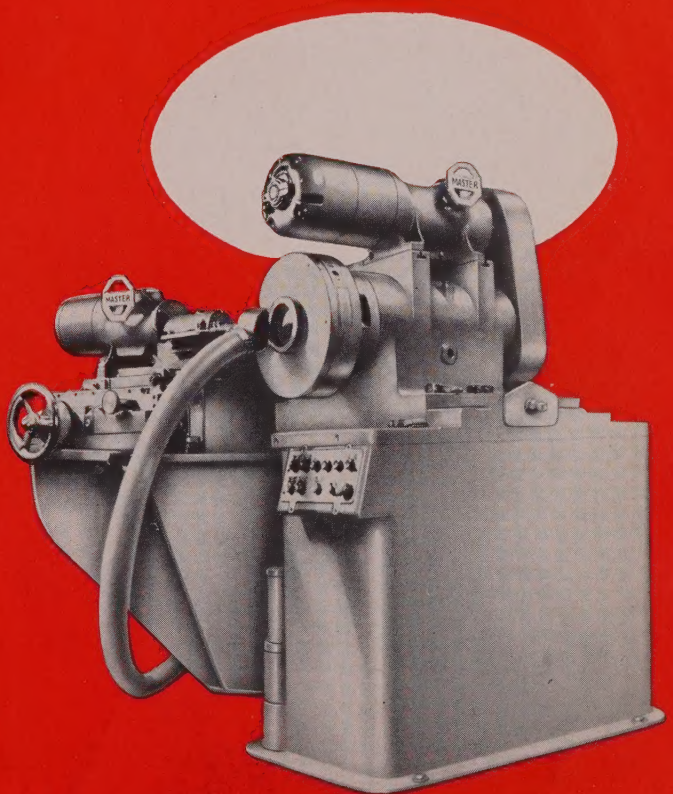
reason

The electric motor, the electric brake, the variable speed drive, the gear reduction unit . . . all are designed so that they easily combine into an integral power drive.

result

The RIGHT horsepower, the RIGHT shaft speed, the RIGHT features in one compact unit that you can use RIGHT where you want it. Only one unit to buy, handle and install . . . saves time, space and money.

Use Master power drives to increase the salability of your motor driven products . . . improve the economy, safety and productivity of your plant equipment. They're the horsesense way to use horsepower.



THE MASTER ELECTRIC COMPANY • DAYTON, OHIO

New straightener automatically adjusts for different size tubes and bars

. . . has 40 TIMKEN® bearings

WHEN you switch from one size bar or tube to another, this new Sutton straightener automatically adjusts its straightening rolls to take the new size. This enables you to switch from 1¼″ O.D. tube to 3¾″ in less than a minute and a half!

Because straightening rolls must withstand heavy radial and thrust loads as the work passes through, they are mounted on Timken® tapered roller bearings. The taper enables the bearing to take both radial and thrust loads. Line contact between rollers and races gives them high load-carrying capacity. The net result is accurate shaft alignment and trouble-free operation.

This straightener uses a total of 40 Timken bearings—in the idler rolls, universal joints, and drive unit as well as the driven rolls. Space is at a premium and the compactness of Timken bearings is a big advantage. Their high load-carrying capacity permits a relatively small-size bearing. And no space-taking thrust bearings are required.

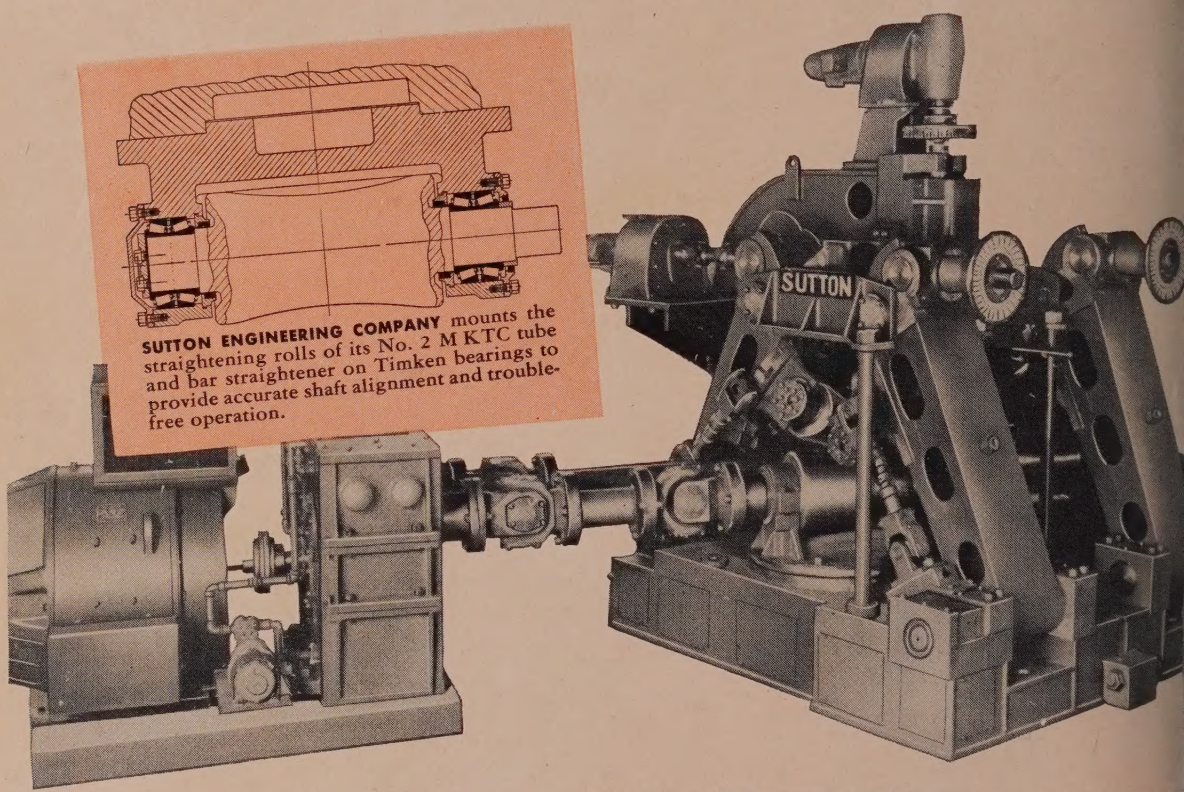
Timken bearings minimize friction because they have true rolling motion and *incredibly* smooth surface finis This helps provide a smooth-runnin machine despite the heavy variab loads. It also means longer life an minimum maintenance.

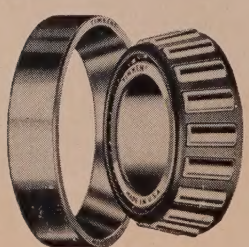
Timken bearings are a sure sig of quality on the machines you bu and the machines you build. Look fo the trade-mark "Timken". The Tim ken Roller Bearing Company, Canto 6, Ohio. Canadian plant: St. Thoma Ontario. Cable: "TIMROSCO".

TIMKEN BEARING EQUIPPED

This symbol on a product mea its bearings are the best.

SUTTON ENGINEERING COMPANY mounts the straightening rolls of its No. 2 M KTC tube and bar straightener on Timken bearings to provide accurate shaft alignment and trouble-free operation.

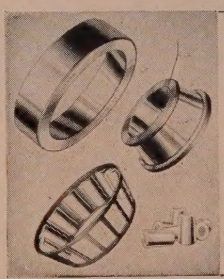




TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



DESIGN LEADERSHIP

The first Timken tapered roller bearing was produced in 1898. Since then the one-piece multiple perforated cage, wide area contact between roller ends and ribs, and every other important tapered roller bearing improvement have been introduced by The Timken Roller Bearing Company.

The Timken Company leads in 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis steels.

NOT JUST A BALL ◯ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◯ AND THRUST → ◯ ← LOADS OR ANY COMBINATION